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CHRONICLE OF THE WORLD HEALTH ORGANIZATION

THE CHILD IN HOSPITAL
DENTAL HEALTH
RESULTS OF RECENT INTERNATIONAL STUDIES ON TUBERCULOSIS
KWASHIORKOR IN CENTRAL AMERICA

NOTES AND NEWS
REVIEW OF PUBLICATIONS



WORLD HEALTH ORGANIZATION
PALAIS DES NATIONS
GENEVA

The World Health Organization (WHO) is a specialized agency of the United Nations and represents the culmination of efforts to establish a single intergovernmental health agency. As such, it inherits the functions of antecedent organizations such as the Office International d'Hygiène Publique, the Health Organisation of the League of Nations, and the Health Division of UNRRA.

WHO had its origin in the proposal made at the United Nations Conference held in San Francisco in 1945 that a specialized agency be created to deal with all matters relating to health. In 1946 representatives of 61 governments met at the International Health Conference, New York, drafted and signed the WHO Constitution, and established an Interim Commission to serve until the Constitution could be ratified by 26 Member States of the United Nations. The Constitution came into force on 7 April 1948; the First World Health Assembly met in Geneva in June 1948, and on 1 September 1948 the permanent Organization was established.

The work of the Organization is carried out by three organs: the World Health Assembly, the supreme authority to which all Member States send delegates; the Executive Board, the executive organ of the Health Assembly, consisting of 18 persons designated by as many Member States; and a Secretariat under the Director General.

The scope of WHO's interests and activities exceeds that of any previous international health organization and includes, in addition to major projects relating to malaria, tuberculosis, venereal diseases, and treponematoses, maternal and child health, nutrition, and environmental sanitation, special programmes on public health administration, epidemic diseases, mental health, professional and technical training, and other public health subjects. It is also continuing work begun by earlier organizations on biological standardization, unification of pharmacopoeias, addiction, poisoning, drugs, health statistics, international sanitary regulations, and the collection and dissemination of technical information, including epidemiological statistics.

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SCHEDULE OF MEETINGS

10 January	Executive Board, Standing Committee on Administration and Finance Geneva
18 January	Executive Board fifteenth session, Geneva
17-23 February	Study Group on the Psychobiological Development of the Child third meeting, Geneva
21-26 February	International Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death Paris

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A HUMAN APPROACH

Address by Prime Minister Nehru to Regional Committee for South-East Asia

The Inaugural address of Prime Minister Jawaharlal Nehru to the seventh session of the WHO Regional Committee for South-East Asia (New Delhi 21 September 1954) is of more than regional interest. The text below is a slightly abridged version of this address.

We live in days when there is a great deal of disturbance in the mental apparatus of humanity. Even though your Organization may not touch upon these matters directly I imagine that the kind of work WHO is doing must have a considerable effect on the disturbed state of the world's mental health. We are faced with many problems which do not easily yield to satisfactory solution. In the realm of politics specifically one finds attempts being made to solve these problems by what might be called the direct approach. One goes along head foremost in the effort to solve them, usually coming across somebody else's head which is bent on solving the problems in the opposite direction. Then the two heads come into conflict.

It may be that it is easier to consider and to solve this kind of problems in a rather indirect way with indirect approaches. The indirect approach sometimes reaches the desired objectives much sooner than what I have called the direct approach because it undermines and goes around the defences of the opposition which it may have to meet. It takes them almost unawares while the direct aggressive approach often leads to direct aggressive defence and conflict occurs.

I mention this because the activities of some of the important organs of the United Nations like WHO and UNESCO or others would appear to be some distance removed from the political conflicts of the world. In these activities it is possible to adopt an approach which does not bring about active opposition and conflict. You use the direct approach of course in dealing directly with health problems. This is certainly the correct approach. But it also becomes the indirect approach in dealing with world problems of another kind—the mental conflicts, the political events—because it can produce an atmosphere which soothes and which enables people at least to talk to each other in a quiet and dispassionate way. Therefore quite apart from the good work that these agencies are doing directly there is the indirect aspect of their work which can help create an atmosphere favourable to the solution of our daily problems in the political sphere.

The direct work that you do in regard to health is particularly needed and welcome in the countries of this region from which you as representatives have come together today. In health matters these countries are rather backward and the more we can do to improve

health and sanitation, the better. There are of course many different aspects of this work. But the one aspect which seems to me to have greater importance than any other is work that concerns children. I think that first priority should always be given to children—to the young people who are building for the future. They are the essential "human material" which has to be looked after first and above all else. I do not mean to say that you should ignore others, but after all, it is easier to deal with children than with those who are confirmed in their habits and their ways. And our children are our tomorrow.

For this reason I hope that in all these countries, whether from the point of view of health or other similar points of view, the children will always be considered first, and that provision will be made for their proper growth, adequate opportunities being given them to live in an environment suited to the development of their full powers and creativity. Nothing is so sad for me as to see little children not looked after and not cared for, not having the basic needs met which should be fulfilled for every child—quite apart from the loving care that a child deserves. If we can provide even some background for raising levels of child welfare—not merely by putting up more clinics and hospitals, but in a wider sense by creating a better environment for children to grow up in—then it will be a very great thing indeed that we have accomplished.

In many of the countries that you represent, populations are large and growing larger every year. Some people are greatly alarmed at the rate of population growth in the countries of South East Asia. I myself do not like it. I should like this rapid growth to be checked. But I am not alarmed about it, and I see no reason, as some people do, to consider that the end of the world is coming because some populations are getting bigger and bigger.

I think we should take a balanced view of these matters. While certainly working to check the growth of the population in the best ways that we can devise, we should nevertheless not get cold feet and draw up imaginative statistics of what the world's population may be in 20 or 30 or 50 years from now.

Of course the fact remains that the population problem is an important problem and should be dealt with. Efforts must certainly be made to control it. Even though the growth of the population may not lead to any such grave crisis, it undoubtedly results in a lowering of standards. Moreover, we cannot raise standards of living very much if the population goes on increasing at a rate so rapid that economic gains are offset by it. We have not only to catch up with it in raising the standards of our peoples and come to what we consider a normal economic level, but we must also meet the rise of the population which tends to pull that level down.

One has to deal with the population problem in this way and make people appreciate the need for seeing it in these terms. Many persons who discuss this question talk about it either theoretically and academically or heatedly, bringing into the argument their own particular prejudices and their own special outlooks. Neither approach is very helpful because, in this matter—as indeed in all such matters—one has to do with human beings. It amazes me how often we forget the human being in our statistical conferences. We think in terms of blocks and curves or other such figures, forgetting that all these things represent individual men, women, and children, not very different from any of us.

I should like therefore, when I talk about the human approach to the population problem, to stress the need to remember that it is human beings we have to deal with. They are not blocks; they are not some mechanical gadgets that you can play about with and order about. Not even the most authoritarian State can get very far in this way. It may go some distance

towards teaching people how to act as regimented human beings but not even in this can it go very far. Much less can such things be done by the State which is not authoritarian.

We have to treat people as individual human beings who must be convinced who must be made to understand and must be won over to any cause we seek to further. Also since it is in this way that we must deal with human beings we cannot deal with them effectively if we presume to speak to them as their superiors. No person who goes to another with an attitude of superiority is likely to find any kind of real opening to the mind or the heart of the other man. There is too much of this superior approach of "doing good to others" too much of imagining that we are better than others. We may know a little more we may have more comforts we may have more privileges. But the presumption that we are better than others just because of these things is I think not only totally unjustified but also foolish.

Any division of people into various grades and classes of superiority or inferiority is untenable. No one of course would claim that all human beings are equal in character in working capacity and so forth. Nevertheless the approach to other human beings on the basis of inequality of any kind—whether it be of class or race or nationality—is a wrong approach. It does not lead to results. One has to win the goodwill and the friendship of the persons one deals with.

In conclusion I should like to lay stress on three aspects of your work. Of these one is the special importance of children and their health. Another is the human approach to the masses who live in this part of the world—the need to think of them always as individuals and not as graphs or curves or figures. And the third is the necessity always to remember that physical health is only a small part of total health the rest being mental health. For if we do not have mental health physical health will go to pieces. Therefore in an indirect way—not directly but in your own indirect way—you are trying to help soften the conflicts that exist in the world and are thereby creating an atmosphere which may contribute to the solution of the world's problems.

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with them throughout their stay in hospital when the paediatrician and psychiatrist feel that this is in the child's interest. In other cases mothers may spend at least the early period of the admission with their children to help them adjust to the new situation.

In all cases whether or not the mother remains with the child the reception of the child must be carefully studied and an appreciation of his feelings shown. The child should be allowed to keep the toy which means "home" to him and he should not be deprived of his clothes or forced to take a bath immediately on admission if this causes anxiety. The hospital staff in helping him over separation from his parents should avoid any deceptions for above all the child needs to feel confidence in those who are going to care for him.

Life in hospital

Hospital design can contribute greatly to the ease with which child patients adjust to hospital life. Ideally wards should be small with furnishings which appeal to children and which are similar to those most common at home. Every effort should be made to give the hospital as "home-like" an appearance as possible.

The physician or nurse who deals with children must be sensitive to the need to dispense with any routine procedures which are not absolutely necessary and which may be frightening or painful to a child. All hospital procedures ought to be viewed in the light of what they may mean to the child subjected to them.

Most important is the creation of the right emotional atmosphere in the ward. Separated from his home surroundings the child needs to acquire some familiar support which will give him a sense of security. Efforts should be made to the extent that staffing will permit the assignment of each child to a particular nurse to whom he can become

accustomed throughout his illness. It is also desirable that the same doctor should care for the child in the outpatient department as in the ward whenever this is possible.

Attitudes towards visiting by parents vary greatly from country to country and from hospital to hospital. In contrast to some countries of Europe and the Americas where it is considered desirable to "toughen" the child visiting has never been forbidden in Italy except in individual cases where it has been considered harmful to the child. In East Africa among a people "closer to nature" a child is never left alone during his stay in hospital. His mother or some other member of his family is at his bedside day and night and sometimes the whole family is with him.

One of the arguments against visiting has always been the danger of cross infection but an investigation in the United Kingdom produced no positive evidence that visiting by adults increased infection. With these and other relevant factors in mind the study group in general favoured visiting.

There are certain practical problems which need to be considered if visiting is to be effectively introduced. In large hospitals for instance visiting hours may have to be staggered to prevent congestion. In general visiting is best regarded as a therapeutic action taking into account the child's relationship with his family and the parental attitude towards the child.

Mothers fit into the life of the ward much more easily when given something to do. They should be encouraged to play with the child to give him a meal or a bath to read a story or to tuck him up for the night. The father is also a valuable visitor for older children where a good relationship has been established and visits from friends of the same age are often appreciated by children.

Maintaining family relationships is more difficult in long stay cases especially if the hospital is far from the home but every

THE CHILD IN HOSPITAL

There is a growing realization that a great deal more than physical care is required if the child in hospital is to be given satisfactory therapy and be protected against any ill after effects of the hospital experience. Few will question that the best place to care for a sick child is in his own home. When it is absolutely essential to admit him to a hospital, attention must be given to prevention of emotional disturbance and to the psychological problems to which hospitalization may give rise. Properly handled, the hospital experience may even contribute to the emotional development of the child; improperly handled, it may do irreparable psychological damage.

The problem of the child in hospital consequent implications in the training of paediatricians, psychiatrists, and other relevant personnel, and the co-ordination of the health services which deal with the child in hospital were the three topics discussed by a study group which met under the auspices of the WHO Regional Office for Europe in early September 1954 in Stockholm¹. This group, composed of 20 paediatricians, 10 psychiatrists, a psychologist and a medical social worker, aimed not to produce a blueprint for general action but to exchange experience and to stimulate wider interest in, and awareness of, the psychological aspects of illness. Six case histories were used to illustrate various types of problems and to serve as the basis of discussion.

The general conclusions which follow should not be interpreted as definite or complete and obviously require careful modification to suit the available services and varied circumstances in different countries.

THE CHILD AS A HOSPITAL PATIENT

Admission

The young child is unable to comprehend what illness is. Even for an adult, who understands that the interlude will sooner or later come to an end, admission to hospital is a major event. But the small child has no realization of time, and the break in so far as he is concerned is irrevocable unless he has some tangible means of grasping that this is not so. Further, the child may feel that being hospitalized is a rejection on the part of his parents, and fears of this nature may remain unexpressed with him for the rest of his life. It is most important therefore, that a child be prepared emotionally for his admission into hospital if this is at all possible. His admission should be carefully planned by the paediatric service in the light of the child's home background and of what the hospitalization is attempting to achieve.

Emergency admissions of course, present a different problem. The physical aspects of the case have to be dealt with first and foremost. The situation is usually one of anxiety; the parents need help and support, and the child should be given ample opportunity later to play out his anxieties both in the hospital and after his return home.

The study group considered at length the question of whether or not it is advisable to admit the mother with the child. Mention was made of the good results which have been obtained in a hospital for surgical treatment in New Zealand where every child is accompanied by his mother and is cared for entirely by her except when he is in the operating theatre. It seems desirable that young children should have their mothers

¹ A more complete report on the discussions of the study group will appear in the Bulletin of the World Health Organization.

may become familiar with behaviour problems and psychological disorders in children. By learning about the normal physical and psychological development of the child and then about the deviations therefrom and the ills to which the child may be subject the paediatrician is able to delineate his role and know which patients he can treat and which need further expert help. He is also able to assume the role which is his—that of a “synthesiser” of modern knowledge of the child in health and in disease.

The child psychiatrist

The child psychiatrist, like the paediatrician, needs some experience of the other discipline in order to gain a well rounded picture of the child patient. He should be given a chance to work in a paediatric centre where he can be taught the “dynamics of growth and development and learn at first hand about the infant and child in their different phases”. Furthermore he should if possible have experience with children not merely in the hospital but also in the nursery school and in family surroundings.

The child psychiatrist's training should include basic knowledge of cultural anthropology and sociology. In this connexion it should be noted that differences in social and cultural background from one country to another make psychiatry a difficult discipline to transmit and training in one country may not always meet the needs of another.

Another question debated by the study group was whether or not psycho-analysis should be part of the training of the child psychiatrist. It was concluded that at least theoretical knowledge of psycho-analysis is essential and personal experience of it often desirable.

In summary the study group felt that the child psychiatrist's special training should include (1) knowledge of the cultural patterns of behaviour and of emotional development

(2) carefully planned training in paediatrics
(3) practice in the diagnosis and treatment of both adults and children as a result of his psychiatric and neurological training and
(4) experience of personal psycho-analysis unless this is contra indicated or is not feasible. The necessity for such varied and extensive training was explained by one member of the group who said

“The problem of mental illness in many countries of Europe today is of similar magnitude to that of physical illness in tropical parts of the world. There is an acute sense of the need to have specialists to deal with this. There is intense pressure from the lay public. The possibility of giving qualified help is not good. It seems important that the relatively few specialists there are besides being clinicians should be given the chance to act indirectly through training future doctors. For this task they need the best possible training and qualifications.”

The paediatric nurse

The nurse who works with children needs special training with due attention given to comprehensive study of child development as well as to illnesses and their treatment. The study group emphasized the desirability of improving the nurse's status by accepting her as a full member of the paediatric team, drawing her into conferences and discussions and improving her training and pay.

As part of her training the paediatric nurse should gain an understanding of the psychological aspects of illness. She must be aware of her role as a parent substitute to the child in hospital and of what this means to her as well as to the patients, her role as mother may become one which she enjoys and guards too jealously thereby creating additional emotional disturbances. If the nurse during her training period understands the psychological aspects of her future work, she is better able to deal with such situations when they arise.

The nurses least easily won over to the more individual and human approach to children in hospital are those whose training

effort must be made to assure the contact. Play nurses or local visitors may help to alleviate difficulties, though neither can fulfil the role played by the parents.

Discharge

In well run paediatric hospitals, where the staff is understanding and there are play rooms and other facilities for the ambulant child, the young patient may sometimes be reluctant to go home. The child may find more friendship, pleasure and sense of security in the hospital than in his home. If the hospital is not so pleasant there may be residual fears and anxieties. In either situation, the idea that the stay in hospital is due to a rejection by the parents may need skilled handling. An understanding of the emotional state of a young patient on discharge from hospital is as important as on admission.

The paediatrician should discuss the implications with the parents so that they will know how to aid the child in readjustment to his life at home. It is sometimes helpful, if the child has been in hospital for a long time for the mother to come and spend a few days with him before he is discharged. Another alternative is for the child to make the transition to life at home gradually by going home first for a day, then for weekends before his final return. The medical social worker and the public health nurse may give valuable assistance since they are familiar with the home situation and can help in the smooth re-establishment of good relations between the young patient and his family.

TRAINING OF PERSONNEL TO WORK WITH CHILDREN IN HOSPITAL

Throughout its discussions the study group stressed that what is needed in dealing with the child in hospital is a synthesis of available knowledge, a co-ordination of the disciplines

concerned, with a full awareness of family life and child development, which is too often neglected in medical studies. The child should be seen as a whole and in relation to his background.

The training of three special types of personnel—the paediatrician, the child psychiatrist, and the paediatric nurse—was considered at some length and that of the child psychologist and of the psychiatric social worker was discussed particularly in terms of their roles as members of the psychiatric team. For obvious reasons the conclusions reached cannot have general application. Each country can solve the problems only in the light of its own particular needs and the numbers of relevant staff available to look after children in hospital.

The paediatrician

The proper approach to the sick child can best be learned by observation of a skilled and experienced paediatrician at work and it is thus that the medical student should be initiated into the technique of handling child patients. By noting the paediatrician's way of establishing contact with the child, the student learns that the child is not a miniature adult and that he has to be treated differently as befits his age and understanding. He comes to realize too that the treatment of the child begins with the initial interview, and that every gesture plays its part in the success of the treatment.

In order to promote the development of a more comprehensive approach to the individual patient, team work among the various departments of the medical teaching institution is needed. For example the paediatrician in training should have an opportunity to work with a psychiatric team in a children's hospital. If this is not possible, then he should after studying the normal child, later spend a year in a child psychiatry department, a child guidance clinic or both so that he

and experience have steeped them in routine procedure. Such staff members need to be re-orientated and to be allowed to be less rigid in their practice when it relates to children—to 'humanize' hospital care.

Various practical measures were suggested by the study group for alleviating the shortage of nurses. Among them were the use of auxiliary personnel for some functions that do not require special training and the short term training of nurse assistants for the same purpose. The possibility of recruiting male nurses for work with children was mentioned as being also worthy of further consideration.

COORDINATION OF PAEDIATRIC AND PSYCHIATRIC SERVICES

With the aid of a number of case histories, the study group considered methods of co-ordinating paediatric and psychiatric services. The chief question was: When should the paediatrician call in the psychiatrist? It was agreed that whenever a case seemed likely to be chronic and was obviously associated with emotional factors—common examples being found among children with asthma—the psychiatrist should be consulted at the point of diagnosis, since careful diagnosis is in fact the first step in treatment. An illustration was cited of a polyclinic for asthmatic cases in Helsinki where a psychiatrist and a social worker are members of the staff: see all cases and give outpatient treatment whenever investigation justifies it. The results have been most satisfactory.

One method of co-ordinating services is what is referred to as "multiple rounds", in which the paediatrician is accompanied on his ward visits by other members of the team—psychiatrist, psychologist, social worker, and others concerned.

The interrelationship of the paediatric and psychiatric departments was discussed at length by the study group and it was generally agreed that the first consideration is the prevention of serious psychiatric illness through the offices of the paediatrician, the family doctor, the health visitor, and the maternal and child welfare services. Next in importance is the co-ordination of paediatric and psychiatric services so that mental disorders may be recognized and treated early. Prevention and early recognition of psychiatric illness can do much to relieve the pressure of work on the trained psychiatrists, of whom there are far too few to meet today's needs.

The child psychiatrist should act as a consultant and advise the paediatrician in certain cases in the same way as does the radiologist or the pathologist. In others, where psychotherapy is called for, he should assume full charge, though with the continuing collaboration of the paediatrician as indicated. When the child psychiatric unit is an independent one it should be situated near the paediatric department so that a two-way exchange of assistance may be facilitated.

Only through the co-ordination of all the various specialists concerned with the care of children can a comprehensive picture of the child patient be obtained and adequate treatment be given.

Morbidity and Mortality Statistics

Volume 7 number 12 of the *Epidemiological and Vital Statistics Report* is devoted to statistical data on mortality from gastritis, duodenitis, enteritis, and colitis (except diarrhoea of the newborn) and on cases of and deaths from certain infectious diseases—cholera, typhoid and paratyphoid fevers, diphtheria, and infectious hepatitis.

placed on its early treatment and the qualified dental practitioner should be a member of the treatment team

Oral cancer

According to statistics in countries where comprehensive data are available oral cancer comprises about 8% of all reported cases of cancer. From a dental health viewpoint the important factor with regard to oral cancer is its early detection and referral for further diagnosis and treatment to the proper practitioners.

COLLECTION OF BASIC DATA FOR PLANNING A DENTAL HEALTH PROGRAMME

The solution of dental health problems must be based on information on the prevalence and extent of dental diseases in a population in relation to its cultural, social and economic characteristics. To obtain this information surveys should be made and such surveys should be integrated with and utilize the findings of other surveys in the interests of efficiency and economy and to prevent unnecessary duplication of effort.

For an estimation of the prevalence of dental caries a sampling technique may be used: a survey being made of a certain proportion of each age-group of the population. Inspections using a mouth mirror and explorer should be made by personnel—qualified dental practitioners or others—trained in this technique to determine the number of decayed, missing or filled permanent teeth. The information recorded for the proportion of each age group may then be applied to an established correlation curve to estimate the prevalence of caries for the total age group.

Standardized survey methods have not yet been devised for dental disorders other than caries. In general it may be said that each

case must be assessed on a qualitative basis and that this requires specially trained personnel.

In addition to an estimation of the prevalence of dental diseases the survey which is to serve as the basis for planning a dental health programme should include information concerning economic characteristics of the population including occupations etc. social customs and religious attitudes, beliefs and interests, food habits including selection, preparation and consumption of foods and their nutritive values, relevant practices such as mouth-cleansing, betel nut-chewing and sucking of sugar cane, drinking water resources including the fluoride content of the water, patterns of community organization, educational resources including channels of communication, transportation facilities and dental personnel and equipment resources.

ORGANIZATION AND ADMINISTRATION OF A DENTAL HEALTH PROGRAMME

Personnel

The qualified dental practitioner is the first essential in planning, organizing and administering a dental health programme. Auxiliary and ancillary personnel may play an active part in both preventive and curative services but their role must be supplementary to not a substitute for that of the qualified dental practitioner. Governments should give adequate attention to establishing or aiding the establishment of educational facilities for all types of dental personnel and to assuring that the training given is of a satisfactory standard.

The planning and implementation of a dental health programme on a national or regional basis should be the responsibility of a person who is a graduate of a recognized professional dental institution who should have had experience in the administration of dental public health programmes and who

Dental caries

Dental caries takes a regular and uniform course in its attack on the different surfaces of the teeth it destroys the hard tissues, producing lesions which progressively increase in size. Through the blood vessels of the pulp, dental caries may cause infection in other organs of the body and the digestive disturbances to which it may give rise are also injurious to the general health of the individual. The consequences of the disease are especially serious in childhood and adolescence.

There are now scientifically based means of controlling caries. One is reduction in the consumption of sticky, fermentable carbohydrates especially between meals. Related to this is the removal of such foods from the surfaces of the teeth before they are converted into acids. Ending meals with fibrous, self-cleansing foods may serve the purpose; another means is of course systematically brushing the teeth immediately after meals. An alternative if brushing the teeth is not practicable, is to rinse the mouth thoroughly within ten minutes after eating. A method of caries control which has been proven effective in recent years is fluoridation of drinking water or topical application of fluorides to increase the resistance of the teeth to caries attack. Most important of all is the provision of an adequate diet, particularly for expectant and nursing mothers and for children from the earliest age.

Periodontal diseases

Periodontal diseases probably cause loss of teeth to a greater extent than do dental caries. This loss, in turn, causes masticatory insufficiency and may lead to digestive and nutritional disorders. However the recognition and treatment of periodontal diseases

are often neglected because they rarely cause pain.

There is less reliable knowledge of the periodontal diseases and their control than of dental caries. Their prevention depends largely upon education in proper diet, effective chewing and correctly applied oral hygiene. The use of stiff pointed twigs, which is a common practice in some areas, should be avoided. Irregularities of the teeth, carious lesions, and defective restorative work may all contribute to periodontal diseases and should be corrected or treated as the case may be.

Irregularities of the teeth and jaws

These conditions in their severe forms, may cause psychological as well as physical damage. They are sometimes responsible for periodontal disease and an increased susceptibility to dental caries, and they frequently result in masticatory insufficiency.

Most special corrective measures against irregularities of the teeth and jaws have to be prescribed by the dentist after he has made an adequate diagnosis. The attention of the public should be drawn to the effects of bad habits such as finger or thumb sucking which may contribute to these irregularities and to the importance of proper diet, which aids normal development of the jaws and acts in a general way against caries thus keeping both the deciduous and the permanent dentition intact as long as possible.

Hare lip and cleft palate

This common congenital defect is apt to cause dental disorders and may later be associated with serious emotional disturbances. In areas where statistics are available it has been noted to occur in approximately 1 in every 800 live births.

No preventive measures for hare lip and cleft palate are known. Emphasis should be

is needed. Although research has already resulted in considerable progress in both preventive and restorative dentistry comparatively little financial support has been available for scientific investigation of dental diseases.

Every possible effort should be made to encourage greater support for laboratory and clinical research in dentistry and for investigations in dental education and in dental public health administration.

POSSIBLE FUTURE DEVELOPMENTS

The WHO consultant group gave due attention to possible future developments in dental health. While some of its suggestions were in the nature of administrative and organizational recommendations addressed directly to WHO, others were of wider scope and of general interest to dental and public health workers.

It was suggested for example that advice and assistance should be given to strengthen the education and training of dental personnel. These might include aid in establishing educational facilities where needed; providing fellowships for study at home or abroad; making teachers available in special branches of dentistry; developing courses in public health for dental personnel; supplying teachers and guidance for training of dental auxiliaries and ancillaries; assistance in the provision of training in dental health educa-

tion for health workers, teachers and other relevant personnel; and in providing the means for translating text books so as to widen their effective use.

The advisability of stimulating and co-ordinating studies on dental health was also stressed; such studies to be carried out at the level of each individual country as well as on an international basis. Among the subjects singled out for possible study were: scientific methods in preventive and curative services; etiology, pathogenesis and epidemiology of dental diseases; nutritional problems in relation to dental diseases and habits; vehicles for fluoride consumption and methods of topical application of fluoride; racial immunity to caries and racial tendency to periodontal disease; statistical studies of the incidence of dental diseases in the light of environmental factors such as natural variations in soil water etc.; problems of dental education and dental public health administration; the role of auxiliary and ancillary dental personnel under varying conditions; methods of teaching dental health; governmental standards and regulations with regard to dental education and dental practice; and dental educational institutions and their curricula in different countries.

The group emphasized the value of conferences and seminars on a regional basis to facilitate the exchange of scientific knowledge and experience in dentistry.

Statistics on Venereal Diseases

A recent issue of the *Epidemiological and Vital Statistics Report* (1954, volume 7, number 11) presents a collection of statistical tables on syphilis, gonorrhoea, and lymphogranuloma venereum. It includes data on deaths attributed to syphilis since the beginning of the twentieth century; deaths due to general paralysis of the insane since 1921; mortality from syphilis (all forms) and from general paralysis of the insane since the beginning of the twentieth century; deaths from various forms of syphilis (overall data and data by age-group); specific mortality rates for syphilis and general paralysis by sex and age; and infant mortality from syphilis. These statistics may serve as a kind of introduction to studies of venereal diseases subsequently to be undertaken.

in addition, should preferably have completed post graduate work in public health

The key person in dental health services should be the qualified dental practitioner. Although it is recognized that the standards of professional education and training in dentistry vary greatly from one country to another, no population should be satisfied with less than the highest standards of professional services it can command.

In order to utilize most effectively the knowledge and skill of the qualified dental practitioner, dental services should include auxiliary and ancillary personnel. By dental auxiliaries are meant those who carry out certain treatment procedures in the mouth under the supervision of a qualified dental practitioner, dental auxiliaries are those who assist qualified dental practitioners but who do not actually give treatment. The standard of training of auxiliaries and ancillaries will depend to a great extent on socio economic conditions, including the educational levels within a country, and on the recognized needs in dental health.

Services

Dental services may be classified as preventive and curative. The type of services will vary widely according to the needs, resources and degree of development of a country. The manner of providing these services will also vary ranging from a complete system of private dental practice to that of fully government sponsored services.

When the development of a comprehensive dental health service is not possible certain priorities should be established. The following order is recommended: (1) relief of pain and acute infection, (2) dental care of pre-school school age, and adolescent children this to include both prevention in the form of education beginning with the expectant mother, and treatment, which should commence at the earliest possible age, (3) dental

care of expectant and nursing mothers, and (4) dental care of other adults.

A dental health programme should be an integral part of general health services functioning in close co operation with units such as hospitals, clinics, maternal and child health centres, and school health services. In addition there should be liaison not only with other health personnel but also with educators, the local population, and local authorities.

HEALTH EDUCATION

Promotion of dental health requires education of the public in principles of balanced diet, oral hygiene, and other health practices which aid in preventing dental disorders. The methods used for this health education must be appropriate to the social, economic, and cultural conditions of the people, and will vary accordingly from one country to another. Generally speaking, however education for dental health should aim to stimulate recognition of dental health problems and in developing procedures for solving these problems and encourage acceptance of responsibility for effecting improvements. To achieve these aims the initiative, aggressive support, and participation of the population concerned must be enlisted.

While means of mass communication—posters, books, film strips, etc.—may be effective in dental health education particularly of children, a better approach might be through educating the educators—e.g., dentists, physicians, nurses, midwives and teachers—who if adequately informed and motivated, can do much to promote dental health.

RESEARCH

In dentistry as in other sciences there are many problems on which intensive research

and elsewhere. The results of further systematic studies published in a recent number of the *Bulletin*⁴ are briefly summarized here.

Experimental studies on vaccination, allergy, and immunity

To determine whether a strong tuberculin reaction in the human is indicative of increased resistance to tuberculosis requires observation of a large number of persons over a period of many years. It was believed that relevant information on this problem could, and should be obtained by experimental studies in animals. Accordingly studies were undertaken in which the TRO field studies on BCG vaccination of school children were duplicated in large numbers of laboratory animals in order to compare responses to various doses and kinds of vaccine in animals and in man and then by infecting the animals with virulent tubercle bacilli, to measure the resistance produced by vaccination and to study the association between resistance and allergic response.

The results already obtained in the course of such experiments indicate that the degree of tuberculin sensitivity in groups of vaccinated animals closely parallels the degree of resistance to tuberculous disease. Both are related to the dose of living BCG given by intradermal injection: the stronger the dose the higher the degree of tuberculin sensitivity and the higher the degree of resistance. It is still much too early to draw final conclusions but the results thus far seem to justify the attempt to produce strong degrees of tuberculin sensitivity in persons vaccinated with BCG.

Naturally acquired tuberculin sensitivity

Ever since Koch's discovery of Old Tuberculin the tuberculin test has been used for

diagnostic as well as epidemiological work. A basic assumption underlying the use of the test has until recently been that the sensitivity elicited by any dose of tuberculin is specific for virulent tuberculous infection. This however was never definitely established.

A TRO study has confirmed and extended previous reports that tuberculosis is not the only cause of tuberculin sensitivity in human populations. The evidence obtained from this study makes it clear that other factors as yet unknown must be responsible for much of the tuberculin sensitivity observed in some parts of the world. Because persons with specific sensitivity cannot be satisfactorily distinguished from those with non-specific sensitivity by tuberculin products in use today the tuberculin test is less efficient for identifying tuberculosis infected persons in countries where non-specific sensitivity is common.

Human sensitivity to human and avian tuberculins

Specific and non-specific sensitivity in domestic animals have been recognized for some years by veterinarians who have developed a comparative test procedure with mammalian and avian tuberculins for use in cattle. The usefulness of this procedure having been proven in animals it has now been tried in humans by simultaneous tests with both human and avian tuberculins in areas with high and low prevalence of non-specific sensitivity. The non-specific sensitivity in the population studied is not thought to be caused by infection with tubercle bacilli of the avian type. The results of the trial suggest that comparative testing with antigens prepared from other types of micro-organisms may disclose a practical way to distinguish persons with specific from those with non-specific tuberculin sensitivity.

RESULTS OF RECENT INTERNATIONAL STUDIES ON TUBERCULOSIS

The WHO Tuberculosis Research Office Copenhagen is engaged in large scale investigations of many problems in tuberculosis control. The results of some of the studies a number of which have been carried out with the co-operation of national health services and research institutions in many parts of the world appear in a recent number of the Bulletin of the World Health Organization. The following account is adapted from the introduction to that number of the Bulletin

While it is generally believed that BCG vaccination does not take the place of other recognized methods of tuberculosis control,¹ WHO and many governments have accepted it as a useful public health measure. More than a hundred million persons have been vaccinated in a number of countries in recent years. Campaigns on such a scale have obviously required enormous effort and expenditure, yet many of the most fundamental problems with regard to BCG vaccination are still far from solved. Should BCG be given to everyone whether or not he has been infected with tuberculosis, or, if it should be given only to those not previously infected, what is the most efficient technique for selecting these persons? Is it essential that sensitivity to tuberculin develop after vaccination—if so, how strong should that sensitivity be?—or can immunity exist even though sensitivity is not produced? Can better vaccines and methods of vaccination be developed? Is BCG vaccination an effective public health method for tuberculosis control? Is it worth what it costs? All these questions are of immediate practical significance.

Vaccination, however, is only one facet of tuberculosis control, in which there are many more problems. The new chemotherapeutic drugs effective against the tubercle bacillus raise high hopes but their value in public

health work—both for treatment and for prevention—is not yet known. Tuberculosis in cattle was recognized long ago by veterinarians as a serious problem yet there is little indication at present as to the extent to which it contributes throughout the world to the problem of tuberculosis in human populations. Tuberculin sensitivity in the human has been extensively studied, yet it is still impossible to determine in those parts of the world where there is much non-specific sensitivity the proportion of individuals actually infected with tuberculosis.

Answers to some of these questions will no doubt, be found in time through isolated individual research. However some problems call for an immediate solution, and still others are of such magnitude that they can be solved only by systematic long term research and by international co-ordination of the research under way in different parts of the world. It was to deal with such problems that the World Health Organization Tuberculosis Research Office (TRO) was set up in February 1949 in Copenhagen.

Some of the results obtained by the TRO up to the end of 1953 have been published in the *Bulletin of the World Health Organization*² in a monograph on BCG vaccination³

¹ *Bull. World Health Org.* 1940 3: 1 279 195 5 245 333 195 7 201 1953 9 8 1

² Edwards L. B. Palmer L. E. & Magn. A. N. (1953) BCG vaccination. Geneva (World Health Organization Monographs Series No. 12)

³ *Off. Rec. World Health Org.* 11 7

afforded by any other to learn something about the course of tuberculosis in a general population after such a campaign has been carried out. At the time of the campaign Finland still had a large number of deaths from tuberculosis (an annual rate of about 150 per 100 000 population). Within 18 months a large proportion of the population up to 25 years old was given BCG vaccination and individual records for persons tested and vaccinated are assumed to be available and complete. Reports of current deaths from tuberculosis can be made available also and trends in tuberculosis death rates evaluated in the light of mortality statistics from 1878 onwards. It will eventually be possible to correlate the results obtained by the BCG campaign in Finland with a complete study published in the *Bulletin* of tuberculosis mortality over the past 75 years.

While Finland has seen a precipitous fall in tuberculosis mortality since 1948 the material available to date offers no conclusive evidence that this fall can be ascribed to BCG vaccination as similar changes have been observed in other countries where BCG has been used either sparingly or not at all. Follow up studies are now in progress based on the records of 830 000 persons tuberculin positive or vaccinated in the mass campaign and it is hoped that these studies will provide further relevant information.

Dual reading in mass radiography

A unique file of the record cards for 1.5 million Danish persons tuberculin tested, X-rayed and BCG vaccinated has been compiled by the Danish Tuberculosis Index and has afforded a most valuable opportunity for the study of many problems. One of these studies analyses the value of dual reading as a routine procedure in mass radiography. It is based on nearly half a million photofluorograms taken in the first counties covered by the mass campaign. The films were first

read by the county's chief chest physician then submitted to a "central" reader who interpreted the films without knowing the result of the first reading. By this procedure the number of cases of active tuberculosis detected by the mass campaign was increased by 20% and the number of cases found of clinically significant pulmonary disease other than active tuberculosis was increased by 45%.

This procedure becomes even more significant if it is realized that mass radiography which is an important tuberculosis case finding procedure in many parts of the world today may well be used to an even greater extent in the future in connexion with anti-microbial drug therapy programmes.

Relation of tuberculin sensitivity to pulmonary calcifications

In a study of the reliability of the single dose 10 TU tuberculin test for identifying tuberculosis infected members of the population tuberculin reaction size was correlated with the frequency of pulmonary (presumably tuberculous) calcification found on the chest photofluorograms for different age groups in the population. It appears that the size of the reaction to the 10 TU test is an entirely reliable sign of tuberculous infection in Denmark at least for persons up to 55 years old.

Tuberculin sensitivity as index of prevalence of bovine infection

Another study has shown definite differences in the average size of tuberculin reactions among adults in different counties in Denmark. The most likely cause of the differences is the prevalence of bovine tuberculosis in the various counties during the past several decades where bovine tuberculosis has been highly prevalent the size of the tuberculin reaction is larger than in counties with little previous bovine infection. If confirmed by further studies now under

Non-specific tuberculin sensitivity

The practical consequences of the existence of non specific tuberculin sensitivity are illustrated by data collected in India by a WHO/UNICEF Regional BCG Assessment Team. Non specific tuberculin sensitivity is highly prevalent in many parts of the country and causes serious difficulties in the selection of uninfected persons for BCG vaccination in some areas more than half the uninfected are not being vaccinated because their tuberculin reactions are large enough to be considered 'positive'. Another complication is that even among BCG vaccinated persons there has been found to be a high proportion displaying such a low degree of tuberculin sensitivity that the question arises whether those persons should be vaccinated. Moreover, the degree of BCG induced sensitivity varies inexplicably from group to group. Such factors have made it apparent that the problems raised by a BCG campaign are far more complex than had been anticipated.

BCG induced tuberculin sensitivity

A low degree of sensitivity after vaccination need not necessarily be expected in all populations as evidence from a study of more than six thousand vaccinated schoolchildren in Denmark indicates. The sensitivity produced by BCG is about as strong as the sensitivity produced by natural (virulent) infection, and has now persisted for five years without evidence of waning or loss. When such strong and persistent tuberculin sensitivity is produced by vaccination (and this is the aim of most BCG programmes) the diagnostic value of the tuberculin test is destroyed.

Lymphadenitis following BCG vaccination

Since an alarming frequency of enlarged and suppurative regional lymph nodes in infants was found in certain BCG campaigns

a study was made of the response, particularly the lymph node response, to BCG vaccination in children of pre school age. The results confirm the general impression that both the dose of BCG and the age of the child contribute to a higher frequency of suppurative lymphadenitis in younger than in older children while having little effect on the resulting tuberculin sensitivity.

The important finding in this study is that gross inaccuracies exist, usually resulting in gross overdosage when the volume of vaccine injected is gauged by the size of the wheal raised in the skin, a common practice in mass vaccination programmes because syringes so often leak. While it is difficult to give a measured dose of vaccine with leaking syringes to persons of any age the difficulty is accentuated in infants, probably owing to the texture of the skin. Leaking syringes are thus a major factor in causing the lymph node complications frequently reported in young children.

Technical problems

Among the minor technical problems that require a practical solution are the following. What is the difference between 5 TU and 10 TU as a one dose tuberculin test for survey work in a general population? Does exposure to light damage tuberculin? Will the results of a programme be affected if the tuberculin reactions are not always read at a fixed interval of time after the test has been given? Can the same site on the forearm be used repeatedly for tuberculin testing? Each of these questions has been made the subject of an investigation, and the results which are reported in the *Bulletin*, are of practical significance to all those engaged in BCG vaccination.

Tuberculosis mortality in Finland

The mass BCG vaccination campaign in Finland is offering an opportunity not

experts were consulted and hospitals maternity and outpatient clinics infant and child welfare centres schools and nutrition centres in the more important towns were visited. Representatives of the Institute of Nutrition for Central America and Panama (INCAP) accompanied and helped the mission.

A report of the mission's survey and findings has been published in a recent number of the *Bulletin of the World Health Organization*² from which the following resume is taken.

Clinical features

The clinical features of the syndrome are fundamentally the same as in kwashiorkor and may be grouped under six headings. First changes in general health include retardation of growth more marked for weight than for height functional retardation and psychological changes which consist mostly of a mixture of apathy and irritability. Secondly changes in the digestive system include diarrhoea which is almost always present either as a consequence of the syndrome or as a pre-existent precipitating factor anorexia which may constitute a serious obstacle to dietary treatment vomiting and, in a number of cases enlargement of the liver. Thirdly metabolic changes are among the most typical and consist of oedema sometimes associated with dehydration and hypoproteinaemia. Fourthly changes in the skin mucous membranes and hair include hyperpigmentation of the skin the affected areas frequently ulcerating in severe cases keratinization vascular changes congestion and atrophy of mucous membranes changes of colour and texture of hair the dyspigmentation of which sometimes causes an appearance described as the "flag sign" (*signo de*

bandera). Fifthly changes in the cardiovascular and haematopoietic systems consist largely and constantly of anaemia usually of the normocytic or slightly macrocytic and slightly hypochromic type and in some cases of cardiac alterations. Finally changes in bones and muscles are represented by a retardation in bone development, dental caries and muscular atony and atrophy.

Prevalence and effect on infant mortality

The syndrome has been observed in children from a few months old up to the age of 12 or 13 years. About 60% of all cases occur between 1 and 4 years of age. Above that age it is more frequent than in Africa, and it is often found in school age children not attending school.

An exact assessment of the actual prevalence of the syndrome is very difficult as only a small proportion of all cases reaches the hospitals and numerous—and some times severe—cases have been seen at infant welfare clinics and in homes. In Costa Rica the number of cases admitted has increased since 1946 but this may be due to better detection of cases and to the fact that mothers now more willingly bring their children to the doctor. These factors may also account for the marked decrease in the mortality from the syndrome in that country.

A survey was made in Sumpango Guatemala on all deaths recorded during one year in order to assess the role of malnutrition as a factor in child mortality. Out of a total of 251 deaths 192 (76.5%) occurred among children under 6 years old—53 (21.2%) under 1 year. Analysis of deaths by broad groups of causes showed that in the second third and fourth years of age digestive causes had been responsible for between 57.1% and 87.5% of the total deaths in each one year age group the main cause of death being severe malnutrition with various complications.

² Aret, M. & Behar, M. (1954). Le syndrome de polystarxie de l'enfance en Amérique centrale (kwashiorkor). In *Bull. Wld Hlth Org.* 11: 891. This study has also been published in *PAO A. Tropical S. vol. 1, No. 13*. English, in the *Boletín de la OSA Int. Sanitaria Panamericana*, in Spanish.

way, this finding may lead to an epidemiological method for estimating the significance of bovine infection in countries where little is known about the prevalence of tuberculosis in cattle

Serological studies of tubercle bacilli

The question of how specific resistance to tuberculosis can be measured, which is a *most urgent one, remains unanswered, despite* many laboratory and clinical investigations during the past decades. It is hoped that serological and histological studies of the immune response in animals, undertaken by the Tuberculosis Immunization Research Centre in collaboration with the field research programme of the TRO and with other centres and laboratories, may lead to the development of a practical laboratory test to measure quantitatively the specific resistance produced by tuberculosis infection and vaccination in man. The first step in this work is described in a paper by the Tuberculosis Immunization Research Centre on the chemical fractionation of culture filtrates of tubercle bacilli and the use of the fractions in various serological tests in an attempt to

find promising leads for a useful test. Extensive work with sera from experimental animals is necessary before the procedures can be evaluated on sera now being collected in field studies by the TRO on large groups of persons with different kinds and degrees of tuberculin sensitivity and tuberculosis infection.

Data on BCG programmes

Comprehensive data for the WHO/UNICEF BCG programme during the two and a half year period from July 1951 to the end of December 1953, with detailed tabulations of the numbers of persons tuberculin tested and vaccinated in each country, by age and sex are included among the TRO studies published in the *Bulletin*. For many countries the data on the frequency of positive reactors constitute the only information available on the prevalence of tuberculous infection. The value of these statistics may well increase with time, for the mass vaccination programmes can be expected to destroy the epidemiological and diagnostic value of the tuberculin test for many years to come.

KWASHIORKOR IN CENTRAL AMERICA

Various syndromes associated with malnutrition were described in Central America under different names as early as 1908; they were generally ascribed to vitamin deficiency or multiple nutritional deficiencies. From 1944 onwards most investigators emphasized the special importance of protein deficiency in the syndrome and related it to similar syndromes observed in other parts of the world.

Although the name *kwashiorkor* has now become widely applied to this clinical entity, the broader expression *syndrome poli-*

carencial infantil (multiple deficiency syndrome in children) is more commonly used in Central and South America.¹

In 1951 FAO and WHO sent a mission to Central America to investigate the syndrome associated with protein deficiency and to study its relation to that already described in Africa as 'kwashiorkor'. This survey was carried out in five countries—Guatemala, Honduras, Nicaragua, Costa Rica and Panama. Health authorities, doctors, paediatricians, social workers and nutrition

ponents of a good diet rather than as vitamin preparations

Various therapeutic methods or agents have been tried as adjuvants to the dietary treatment or in emergency cases and have given good results. These include lipotropic agents, anti-anæmic preparations, blood transfusions, plasma and amino-acid solutions and parenteral rehydration.

The treatment given in the principal hospitals of Central America is usually excellent and has resulted in a reduced mortality rate. However, in numerous secondary hospitals it is still unsatisfactory owing to either ignorance or lack of staff or funds.

Prevention

Methods recommended for preventing the disease include (a) increased production and consumption of foodstuffs rich in animal or vegetable proteins, (b) education of the public in nutritional matters, (c) public health measures and (d) supplementary feeding programmes for the vulnerable groups. Additional animal proteins could be introduced by increased use of skim milk (enriched or supplemented by vitamin A where necessary) and of fish. Attention should be given to the production and consumption of cheap dried, salted or smoked fish and to the preparation of fish flour in a form that would make it acceptable.

An increased protein consumption, however, will for a long time depend mainly on vegetable sources. The possibilities suggested in this field are developing new varieties of maize with a higher content of methionine and tryptophane, increasing the production of certain plants such as beans which are already consumed and selecting the varieties with a high protein content and a balanced amino acid composition, promoting the consumption of ground nuts either untreated or in the form of presscake in combination with starchy roots and using soybean milk as a milk substitute. An attempt has also been made in Mexico to produce a powder incorporating 10% soybean and 90% maize which can be used for the preparation of *tortillas* without altering their taste.

Education of the public in questions of nutrition directed at first towards mothers and schoolchildren, would result in an improvement in food consumption and in the nutritional status of the population. Special programmes of education are already carried out by the INCAP and several co-operative bodies. Peeding the results of these long-term measures, supplementary feeding programmes—particularly the supply of milk to children by UNICEF—have been developed for the most needy groups of the population and should be extended.

Insect Control Symposium Papers Published

The papers presented at the First International Symposium on the Control of Insect Vectors of Disease (see *Chronicle of the World Health Organization* 1954: 8: 1291) have now been published and are available through the Fondazione Emanuele Paternò, Viale Regina Elena, 299, Rome. The papers are in either French or English, with summaries in these two languages and in German and Italian.

Influence of diet on the syndrome

As shown previously in Africa, there is a direct relation between the diet and the syndrome. The growth curve of breast fed children is normal during the first few months but it generally falls off after 6-8 months among the poorer populations of the interior. In general weaning takes place between the ages of one year (among whites or in towns) and two years or more (among Indians). Mixed feeding whenever started, almost always consists of maize gruel (*atole*) supplemented by sweetened water (*agua dulce*) and later by potatoes or sweet potatoes, various roots and vegetables, *tortillas* bread, and occasionally fruit. Between 18 months and three years of age the children are given the usual family diet based mostly on maize. Protein rich foods such as milk, meat, and eggs are rarely included in the diet of the poorer families.

Dietary surveys have been conducted in Guatemala, Honduras, and Costa Rica to determine quantitatively the various foods consumed in groups of rural families selected at random and to assess the value of their nutrient content. While the calorie value of the daily ration is more or less satisfactory (94-102% of the requirements), as is the total protein intake (82-116%), the animal protein intake is very low, and the requirements in calcium, vitamin A, niacin, riboflavin, and ascorbic acid are far from adequately met.

In poor families—in which the syndrome mostly occurs—food consumption is even lower than that of the groups surveyed. An attempt was made to investigate the actual food consumption of children with the syndrome who lived in poor families in Costa Rica. Compared with the actual food intake of a healthy four year old Guatemalan child taken as a reference child and with the standards recommended by the US National Research Council, the actual consumption of these children was strikingly unsatisfactory.

Poverty is thus the main etiological factor responsible for the syndrome, which occurs mainly among very poor families where both protein consumption and calorie intake are low. The diet is always badly balanced and all degrees of undernutrition and malnutrition are seen. However, ignorance also plays a role in maintaining bad feeding habits during or after weaning as well as during illness of children when the diet given to them is still more unbalanced. An example of this is provided by a survey covering four families, in which one child showed the syndrome although the diet of the families as a whole was relatively satisfactory in most its elements, that of the children was highly deficient in all the nutrients and must have accelerated the course of the disease.

Treatment

Treatment of the syndrome in Central America is based on the generally accepted etiology, namely, primary protein deficiency, vitamin deficiency due to inadequate intake, and, frequently, more or less severe undernutrition. The treatment is essentially dietary and consists largely of the administration of skim milk—frequently acidified or supplemented by dextrose—animal proteins, fresh vegetables and as little fat as possible. When anorexia, diarrhoea and oedema have disappeared a more complete and varied diet is introduced, composed predominantly of foods rich in proteins and vitamins and providing an adequate supply of calories.

Although vitamin deficiency is an aggravating factor in the syndrome, it is not always necessary to administer vitamins in therapeutic doses. Large doses of the vitamin B complex, for instance, have been found not merely useless but harmful. The only vitamins that might be specially given when there is a definite deficiency are vitamins A and C which are lacking in a skim milk diet. It is always preferable to give vitamins as com-

ponents of a good diet rather than as vitamin preparations

Various therapeutic methods or agents have been tried as adjuvants to the dietary treatment or in emergency cases and have given good results. These include lipotropic agents, anti-anæmic preparations, blood transfusions, plasma and amino-acid solutions and parenteral rehydration.

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Notes and News

Consultant Group on Atomic Energy In Medicine and Public Health

In December 1954, the Director General convened a group of four scientists to consider the role of atomic energy in the development of medicine and biology and the responsibilities of WHO in this new field. The two main topics of discussion of the consultants were (1) the problems of health protection in dealing with atomic energy, including the disposal of radioactive waste material, nuclear reactor safety, definition of radiological units, and standardization of radioactive materials, and (2) the constructive use of atomic energy in biology, medicine and public health.

The meeting of these consultants was planned by WHO some time ago but was given more urgency by a resolution adopted on 4 December by the United Nations General Assembly which called for an international conference on the peaceful uses of atomic energy and which established an advisory committee charged with the preparation of the conference. The conference is to be held not later than August 1955 and WHO is expected to be called for consultation by the advisory committee and to participate in the conference.

The discussions of the consultant group were led by Dr J Bugher, Director, Division of Biology and Medicine, Atomic Energy Commission, Washington D C, USA. The other members of the group were Dr A J Cipriani, Director, Biology Division, Atomic Energy of Canada Ltd, Chalk River, Canada; Dr J F Loutit, Director, Radio Biological Research Unit, Atomic Energy Research Establishment, Harwell, England; and Professor C Mannebeck, Professor of Physics, University of Louvain, Belgium.

Yaws in Africa

Dr C J Hackett, a tropical disease expert and a specialist on yaws control, has made a study tour of several countries of Africa on behalf of WHO as a preliminary step in a continent wide plan for the control of treponematoses. The purpose of his tour, which took him from Liberia to the Belgian Congo, passing through Sierra Leone, Nigeria, and French Equatorial Africa, was to consult with the various governmental authorities and health services.

WHO is already aiding projects in Bechuanaland, Liberia, and Nigeria, and with the co-operation of UNICEF, is contemplating further treponematoses control operations in Africa. In addition, an international conference on the treponematoses is expected to be held in Africa during 1955.

In the yaws control programme in Nigeria, which is being aided by WHO and UNICEF, 309 502 persons had been examined in three regions of the country by the end of September 1954. About 68% of those examined (206 722 cases) had been treated and 96 427 contacts protected, making a total of 303 149 treatments administered. An effort is being made to reach the highest possible percentage of the population in the areas where yaws is prevalent.

Thailand Sanitation Project

Recognizing the importance of the environment in child health, the Government of Thailand, working with UNICEF and WHO, is including sanitation as part of a maternal and child health demonstration and training project which is under way in Bangkok. The sanitarian assigned to the project, Mr R V Coombs, is training public health personnel, particularly sanitary inspectors, and is advis-

ng the city council on problems of sanitation By the end of March 1955 more than 180 sanitary inspectors will have received training

Among the sanitation problems to which a solution is being sought are surface drainage sewage disposal and rubbish collection Practical improvements have already been realized Advances have also been made through a complete house to-house inspection of the whole city the organization of a school sanitary service formal sanitary control of eating and drinking establishments and of itinerant vendors and supervision of factories workshops and dangerous and offensive trades

Second Asian Malaria Conference

The Second Asian Malaria Conference (Malaria Conference for the Western Pacific and South East Asia Regions) was held in Baguio the Philippines from 15 to 24 November 1954 It was attended by 42 malariologists from 13 different countries

The conference which was sponsored by WHO with the co-operation of the Government of the Philippines reviewed the situation with regard to malaria in the two Regions noting that in the 23 countries and territories concerned with a population of about 659 million persons 276 million live in malarious areas In 1953 80 million persons were being protected against malaria through national and international control efforts

It was agreed by the conference participants that the ultimate goal of nation wide malaria control programmes is the eradication of the disease within as short a time as possible before any possible DDT resistance occurs Malaria eradication has already been achieved in large areas of Ceylon and Thailand

The conference participants devoted most of their time to the discussion of technical problems associated with malaria control but, as at the First Asian Malaria Conference¹ stress was also laid on the economic and social aspects of the disease and its control

Dr Antonio Ejercito Director of the Malaria Control Project Department of Health Philippines was elected Chairman of the conference Dr K C Liang Director of the Taiwan Provincial Malaria Research Institute Vice Chairman and Dr S Soeparmono Director of the Malaria Institute of Indonesia Rapporteur

Following the close of the conference a number of the participants accepted an invitation of the Government of Taiwan to visit malaria-control operations on the island Since May 1952 a large scale antimalaria programme has been under way in Taiwan with the assistance of WHO which is providing the services of a malariologist an entomologist and a public health engineer as well as fellowships for training of local personnel The Foreign Operations Administration (FOA) of the USA is also assisting in this programme through the provision of supplies and equipment

Aid to Sudan in Control of Sleeping Sickness

WHO has signed an agreement to assist the Ministry of Health of the Sudan in efforts to combat trypanosomiasis The Organization has been asked to send a consultant to advise the Government and is providing transport, certain supplies and enough prophylactic drugs for 100000 doses

As the first step in a programme to fight the disease in the south of the country about 30000 persons will be given prophylaxis in three doses administered six months apart At the same time active cases will be referred to health centres for treatment It is hoped that this will lower transmission and the number of new cases pending the institution of permanent control measures

Health Education of the Public

WHO health educators are working in many parts of the world In Liberia a health education consultant on a short term assignment, is assisting in a survey of existing needs and local resources and in planning further

¹ See Chron. Wld Hlth Org. 1954 3: 117

development of health education. In Egypt two former WHO Fellows have returned to their country and are associated with the WHO assisted Government rural demonstration and training project at Caloub, where a health educator has been working for some time. Since 1953, a health educator has been aiding the Government of Libya in improving health through education conducting courses, particularly for young women, and working with health and education authorities and with voluntary organizations. Another health education specialist has been assigned to the All-India Institute of Hygiene and Public Health, Calcutta, to assist in giving instruction in health education of the public in developing a field training programme in health education and in establishing a section on health education within the Institute. In Ceylon, a public health educator has been assigned to the Department of Health Services, Colombo, to aid in the development of a country wide health education programme. Two international health education consultants are working in the Americas—one with the WHO/PASB Zone Office in Guatemala and the other in Paraguay. And in the Region for the Western Pacific, an adviser in health education has been attached to the Regional Office.

During 1954, the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWAPRNE) with the assistance of WHO, trained a group of public health education workers. A health educator was assigned to UNRWAPRNE to aid in organizing and directing the training programme. Seven men and two women, selected from the refugee populations of Gaza, Jordan, Lebanon, and Syria, received six months of academic training at UNRWAPRNE headquarters Beirut, Lebanon. In August 1954 the students were assigned individually to refugee camps in the countries from which they had been recruited to begin a six month period of supervised field training. On the basis of the initial successful operation of this experiment in training the Agency recruited a second group of eleven students who began training in November 1954.

Rural Sanitation in the Americas

Among the subjects covered in reports on health conditions presented by Member States at the sixth session of the WHO Regional Committee for the Americas² were sanitation programmes undertaken during the period 1950-53. Included in these reports was information on water systems, sewage disposal, rural sanitation, elimination of refuse, milk and other food control, control of insect vectors of disease, and housing.

Particular attention is being given in the Americas to environmental sanitation in rural areas and much progress has been noted.

In Brazil, extensive rural sanitation work is being carried on in the greater part of the Amazon Valley, in the valleys of the Doce and São Francisco Rivers and in other parts of the country. Emphasis is on improvement of water supplies, waste disposal, and housing.

In Mexico it is estimated that more than 90% of the rural communities have primitive and inadequate sanitation. In a programme to improve rural sanitation, stress is being laid on school sanitation, with a view to making conditions in the schools at least, better than in the community in general.

In Venezuela, in 1950 90% of the estimated 435 000 dwellings in rural areas lacked privies or other adequate facilities for excreta disposal, and were supplied with water from contaminated or doubtful sources. The Ministry of Health and Welfare is promoting the construction of privies and more than 70 000 have been built during the past seven years. The Government with the assistance of the Institute of Inter American Affairs, has completed water supply installations for 107 communities with a total of 106 984 inhabitants.

Yellow Fever Conference in the Americas

A conference on yellow fever was called by the WHO Regional Office for the Americas in late December 1954. This conference was attended by experts from the Regional

Office and by leading authorities from the US Public Health Service the US Army Navy and Air Force Health Services the Rockefeller Foundation the Atomic Energy Commission the US Department of State the Gorgas Memorial Institute (Panama) and the Carlos Finlay Institute (Colombia) its purpose was to review the present status of yellow fever in the Americas particularly the current movement of jungle yellow fever northward through Central America the 1954 outbreak in Trinidad (after an absence of 40 years) and unusual activity of the virus in Venezuela in the same year and to discuss plans for co-ordinated long range epidemiological studies and control



Yellow fever appeared in Trinidad in 1954 first as a jungle disease and later in the *Aedes-aegypti* infested port of Port of Spain causing economic losses amounting to many millions of dollars. This urban outbreak was the first to occur in a maritime port in the Americas in 25 years and again focused attention on the ever present danger even in periods of lessened activity

For the past six years the Pan American Sanitary Bureau, WHO Regional Office for the Americas has sponsored a continent wide programme for the eradication of *Aedes aegypti* urban vector of yellow fever. All of Bolivia Brazil Chile Costa Rica Ecuador Nicaragua Panama Paraguay and Peru have been declared free of this mosquito and excepting the USA the rest of the countries of the Americas are co-operating in an effort to rid the continent of any further threat of an urban yellow fever epidemic. The progress of the campaign as of the end of October 1954 is shown on the accompanying map. The time is not far distant when with the eradication of *aegypti* from the Americas all possibility of urban and maritime yellow fever will have disappeared forever

Malaria Control Project in East Africa

WHO is assisting the East African Malaria Unit of the British East African High Commission by providing the services of an entomologist, a chemist and two sanitarian technical officers. UNICEF is supplying transport, equipment and insecticides

This international assistance will enable the Malaria Unit to extend the scope of its activities which are under the direction of Dr D Bagster Wilson. Emphasis will be on entomological research in preparation for spraying with dieldrin in a project which aims to stop malaria transmission in the Pare District of Tanganyika and the Taveta Sub-District of Kenya, the combined population of which totals approximately 94 000. Investigations on the bionomics of anopheline larvae in Uganda will also be made. In addition to a study of the vectors and control through insecticides drainage of swamps near towns in Uganda Kenya and Tanganyika is planned with the technical guidance of the sanitary engineer

Continent wide Campaign to Eradicate Malaria

The Pan American Sanitary Bureau WHO Regional Office for the Americas is sponsor

ing a continent wide campaign to eradicate malaria from the Americas. It is hoped that the goal of eradicating the disease from the continent can be achieved in five years or less. The inter American programme is based on recognition of the fact that eradication is possible if intensive control measures are undertaken on a large enough scale to prevent re infection from neighbouring countries—hence the continent wide approach.

It is estimated that there are 135 million persons living in malarious areas in the Americas, of which 60 million live in zones where the infection has been suppressed 45 million in protected zones, and 30 million in unprotected zones. The object of the eradica-

tion campaign will be to eliminate the infection from the unprotected areas and thereby to prevent the re infection of the others.

Experience acquired in countries where eradication has been achieved shows that campaigns to eliminate malaria within a definite period are less costly than programmes of continuing control. A country can claim to be free from malaria if no indigenous case of the disease is reported in three years. According to this criterion malaria has been eradicated from five provinces of the Argentine Republic from three provinces of Ecuador, and from all of the USA, with the possible exception of a few counties in Texas.

Review of WHO Publications

Bulletin of the World Health Organization 1954 11, No 4-5 special double number on malaria control 382 pages Price £1 \$3 00 or Sw fr 12 — Articles in English or in French with resume in the other language

At the end of the Second World War the newly developed contact insecticides with residual action revolutionized methods of malaria control and made it possible to control the disease economically in rural areas. During the last ten years malaria control programmes have developed all over the world and, as a result the objective of WHO in this field—namely the elimination of malaria as a public health problem—is being approached. In some countries eradication has actually been achieved, where malaria has disappeared from both man and mosquito it has even been possible to interrupt active control measures and to replace them by a new policy of defence against the reintroduction of the disease.

Recently a few species of malaria vectors have developed resistance to the chlorinated hydrocarbon insecticides and the possibility

that the same phenomenon may occur in other species is an important factor which will have to be considered in future planning.

This issue of the *Bulletin of the World Health Organization* gives a cross section of the present status of malaria control by residual insecticides—its successes, its limitations, and the problems which have recently arisen.

The first paper, by E J Pampana¹ illustrates the changes that are suggested in the planning of large scale malaria-control programmes today as compared with the past years. P H van Thiel & D Metselaar contribute a preliminary report on the rather important problem of whether malaria transmitted by *Anopheles* of the *punctulatus* group can or cannot, be controlled by residual insecticides. Papers by J Hamon & G Dufour, J Sautet & R Aldighieri, H Floch and C M J Jaujou describe national programmes carried out in tropical and in temperate climates. L Mara reports on a typical co operative project between the government of a country WHO and

UNICEF and illustrates the various investigations that WHO personnel carry out in projects of this kind in order to give the government concerned a clear picture of the local epidemiology and of the bionomics of the vectors in relation to climatology so that the planning of control may be based on sound knowledge of conditions affecting the transmission of the disease in the particular area

F J Dy summarizes the very valuable documentation submitted by governments in the South East Asia and Western Pacific Regions to the First Asian Malaria Conference held in Bangkok in September 1953

M A Farid presents a report on the ineffectiveness of DDT residual spraying in the Jordan Valley This provides a good example of how a combination of several factors can counteract the action of DDT and it emphasizes the importance of preliminary malaria survey work in guiding anti malaria operations

M E Farinaud & R Choumara and I H Vineke relate their experiences in the utilization of antimalaria drugs as adjuvants to residual insecticide methods when the latter are too slow in their action upon transmission

J M Andrews Jean S Grant & R F Fritz give an example of the results of interrupting residual spraying in a country where malaria had been efficiently controlled but which was subject to an influx of infected immigrants G Giglioli gives a further example of how spraying operations may eventually be reduced even in tropical areas by adequate planning

The last three papers in this number of the *Bulletin* deal with the development of resistance to insecticides in anopheline species G D Georgopoulos relates how in Greece *A. sacharovi* which had become resistant to DDT has also been shown to have acquired a lesser susceptibility to chlordane C Garrett Jones & G Gramiccia describe their observations in two villages in Lebanon which gave very strong indications that *A. sacharovi* had developed resistance Finally H Trapido states that observations in sprayed villages

in Panama where *A. albimanus* could again be found in fair numbers in sprayed houses have shown that this species has not developed any change in physiological susceptibility to DDT and that the reduced effectiveness of the spraying may therefore be due to be haviouristic changes in the species

Poliomyelitis (World Health Organization Monograph Series No 26) Geneva, 1955
405 pages Price £2 58 00 or Sw fr 24 —

A new era in the study of poliomyelitis opened in 1949 with the discovery by Enders and his colleagues that poliovirus could be grown in tissue culture The profound significance of this discovery has gained world wide recognition culminating in the award of a Nobel Prize

Now five years after this discovery a great mass of new information on poliovirus is available and there are real hopes of finding practical and effective means of controlling the disease

The time has come when it seems wise to review the present situation in the light of the new knowledge partly to make available in one volume knowledge which is scattered in hundreds of papers in many different publications and partly perhaps more important to see what remains to be done before we can reasonably hope to apply successfully the control measures now under intensive development. Abundant experience in the control of other diseases has shown that the existence of a vaccine is not by itself enough that the methods of its use may make all the difference between success and failure and that the best method of application may differ in different epidemiological circumstances

This WHO monograph is designed to fill these needs Comprehensive reviews are presented of various aspects of poliomyelitis under five main headings epidemiology

clinical aspects, virology, immunology, and control

The first section on epidemiology, contains a review of present knowledge by J R Paul and a study on poliomyelitis in the under developed areas of the world by J H S Gear. These two articles, together with a statistical study by M-J Freyche & J Nielsen on the incidence of the disease and its changing age incidence since 1920 present poliomyelitis as a dynamic problem and show the direction of its evolution

Under 'clinical aspects', R Debre & S Thiesfry consider the symptomatology and diagnosis of poliomyelitis, W R Russell discusses the management of acute poliomyelitis and H C A Lassen gives detailed practical information on the management of respiratory and bulbar paralysis in poliomyelitis

The virus of poliomyelitis is described by S Gard A J Rhodes W Wood & D Duncan consider the place of virus laboratory tests in the diagnosis of the infection J F Enders appropriately, contributes a review of the present status of tissue

culture techniques in the study of the poliomyelitis viruses

Immunization is the only approach to the control of poliomyelitis which gives any prospect of success. It is the subject of three papers. Immunity in poliomyelitis with special reference to vaccination", by A B Sabin, Immunization of man with living poliomyelitis virus, by H Koprowski, and 'Passive immunization against poliomyelitis', by W McD Hammon

Finally, A M M Payne reviews the place of public health measures in the control of poliomyelitis in the light of modern views on the epidemiology of the disease

Like the WHO monograph on influenza this volume on poliomyelitis assembles valuable information by contributors of note on an interesting and complex subject 'covering the most important aspects of recent advances, and offering a range of speculation beyond the province of the orthodox textbook' *

World Health Organization (1954) *Infants and a review of current research* Geneva (World Health Organization Monograph Series No 20) p 8

MALARIA CONTROL

Changing strategy in malaria control

Malaria control in Netherlands New Guinea

La lutte antipaludique à La Réunion

La lutte antipaludique à la Guadeloupe

La lutte antipaludique en Guyane Française

La lutte antipaludique en Corse

Malaria control in South Malabar

Malaria control in Asia

Ineffectiveness of DDT spraying in Jordan Valley

Prophylaxie medicamenteuse du paludisme

Prophylaxie du paludisme au Sud Viet Nam

Imported malaria and malaria control in the USA

Malaria control in British Guiana

Resistance of *Anopheles sacharovi* to chlordane

DDT resistance of *Anopheles sacharovi* in the Levant

DDT resistance in *Anopheles albimanus*

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Plague, from the beginning of history the dread of mankind is a disease which is regressing but which has by no means been eradicated. Endemic in many countries enzootic among wild rodents in vast areas of the world, it remains an important problem in public health.

The author, drawing upon the experience of a lifetime largely devoted to plague, has provided in this work not only a summary of present knowledge, but also a practical guide for clinicians, biologists, health workers and epidemiologists.

Press comments

The Practitioner September 1954 No 1035
Vol 173 pages 326-7

The author is to be congratulated on having produced a volume which will undoubtedly become a standard work of reference "

The Military Surgeon September 1954 Vol 115
No 3 page 233

In summary altogether this book is an invaluable addition to the medical library of organizations and individuals as a complete reference work on plague "

American Journal of Public Health September 1954

He has provided an extremely valuable book not only for research workers but for others who are concerned with efforts against this disease regardless of their professional backgrounds or occupational interests "

British Medical Journal 31 July 1954 page 287

" This is a monumental work and it will be a standard book of reference for many years to come

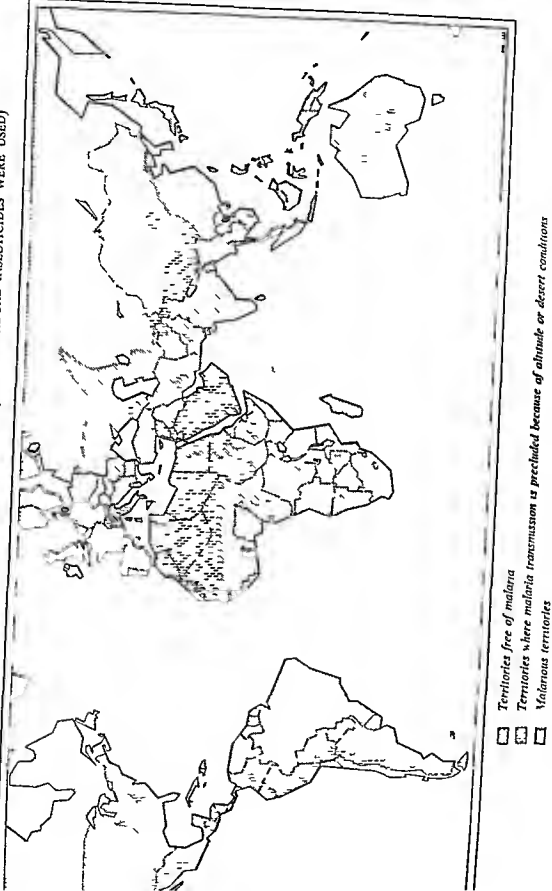


CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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FIG 1 GEOGRAPHICAL DISTRIBUTION OF MALARIA BEFORE 1946 (BEFORE RESIDUAL INSECTICIDES WERE USED)



NATURE AND EXTENT OF THE PROBLEM*

HISTORY

The usual clinical signs and symptoms of plasmodial infections are so characteristic that when they are specified whether in ancient mediaeval or modern writing one safely assumes that the illness thus described must have been malarial regardless of names applied to it at various times and places. Because references to these intermittent fevers can be found in the literature of all historical periods it is generally agreed that malaria has been present from earliest times.

Malaria was never and is not today evenly distributed throughout the world. There is no evidence in the records available for example that it was common in Egypt from the time of Imhotep and the Old Kingdom about 3000 B.C. to about the seventeenth century before Christ yet the disease was undoubtedly widespread in earliest times in the regions that embraced Babylonia and Assyria and India and south China. It has continued to be troublesome in the latter areas up to the present day.

To what extent malaria afflicted the Cretan civilization before 1500 B.C. is not clear but intermittent fevers were subsequently well known in ancient Greece. The Hippocratic writings described the periodicity of malarial paroxysms and noticed that the disease was most prevalent in marshy areas. The intermittents became more common in Greece after 400 B.C. and some authorities believe that they constituted an important factor in the decline of physical vigour intellectual

power and moral fibre which resulted in the downfall of Greece from its high place of world leadership. Greek medical writers in Alexandria and Rome until the third century after Christ continued to give good descriptions of the intermittent fevers. By that time these fevers had apparently begun to appear also in the delta of the Nile but never to any great extent.

There is no evidence that malaria was common among the ancient Etruscans of Italy but the disease certainly was prevalent during the Roman Republic and Empire. It became so disturbing in the Roman Campagna, and even in Rome itself that a goddess of tertian and quartan fevers the "Dea Febris" was worshipped for preventive and curative help. Certain Roman observers such as Varro and Columella clearly noted an association between marshes and malaria. Some authorities believe that as in Greece so in Rome malaria was a powerful factor in accelerating the decline of a civilization.

During the Middle Age intermittent fevers were widespread throughout much of Europe and Asia and doubtless also of Africa. But there is a question as to whether or not they occurred at all in the Americas up to the time when Columbus established a colony at Isabella, on the north shore of Hispaniola in 1493. Many historians believe that the gametocytes of the plasmodia were carried to the Americas by these colonists. Other equally qualified historians such as Arcos of Ecuador and Jaramillo-Arango of Colombia, suggest that malaria may have been taken to the Americas in the dim past when Asians migrated to the western coasts. Arcos states that malaria was rampant for example among the armies of Pachacutec in 1378. Whatever the truth may be malaria was well

This special number of the *Cahiers* was prepared by Dr. E. J. Pampana, Chief Malaria Section, WHO and Dr. F. F. Russell, Rockefeller Foundation, Special WHO Malaria Consultant. Dr. Russell prepared the sections: Nature and extent of the problem, Methods of control, Present obstacles and implications of malaria eradication and Dr. Pampana, the concluding sections.

known in the Americas from the sixteenth century onwards, extending at times all the way from northern Argentina and Chile to southern Canada

During the Renaissance of the fifteenth and sixteenth centuries, there were no great advances in knowledge of malaria. In the seventeenth century, cinchona bark began to be used in treating malarial fevers. This made possible a much clearer definition of the malarial fevers which was further sharpened by the considerable attention Sydenham gave them during severe epidemics in England in 1661-64. Also in this century the belief became widespread that the intermittent fevers were caused by bad air particularly from marshy places.

The eighteenth century saw the beginnings of modern hygiene but malariology was not ready to reap much benefit from this awakening, and the disease continued to be widespread in endemic and epidemic forms. The nineteenth century was one of fundamental progress: the etiology of the disease was uncovered including the identity of the pathogen and mode of its transmission.

The name of the disease originated in Italy, where *mala* meaning bad, and *aria*, meaning air, were joined to form the word 'malaria' referring at first to the cause, not to the disease. This gave rise to the term malarial fevers. Finally from about 1900 the word malaria assumed its present usage in English denoting the disease, not its cause.

PREVALENCE AND DISTRIBUTION

Data do not exist that permit an accurate estimate of the total number of malaria cases occurring in the world each year. But on the basis of acquaintance with malarious areas and wide reading of pertinent reports, one might estimate that, among the approximately 2.5 billion persons on the earth, more than 250 million have

clinical attacks of malaria and possibly 2.5 million die of the disease each year. Better estimates would, of course, be possible if more information were available from the USSR and south China.

Since 1920, malaria has been reported as far north as the Dvina River, near Archangel in the USSR (64°N), and as far south as Cordoba, in Argentina (32°S). It has occurred as high as 2770 m (9086 ft) in the Cochabamba region of Bolivia, where *A. pseudopunctipennis* is the vector, and at 2591 m (8500 ft) near Londiani, in Kenya, Africa, where imported *A. gambiae* and *funestus* shelter in native huts. In Tadzhik SSR in south Central Asia, it is said that *A. superpictus* is a malaria vector at 2850 m (9348 ft). By way of contrast the disease has also been known in the Dead Sea basin 400 m (1312 ft) below sea level. Of course within these limits of altitude and latitude many areas are not infested.

In the central and south Pacific region such islands as the Galapagos, Marquesas, Fiji, New Caledonia, New Zealand, Marshalls and Carolines are entirely without *Anopheles* and so are not malarious. The Hawaiian Islands are also free of malaria. On Guam *Anopheles subpictus indefinitus* appeared after the beginning of the Second World War but up to the present time malaria transmission has not taken place.

Very likely, malaria reached its maximum world dissemination between 1855 when it was found in southern Canada, and 1922-23 when it touched the Arctic Circle in Russia. Since the latter date there has been a downward trend in both distribution and prevalence considerably more marked in some countries than others and recently much accelerated by residual spraying with insecticides. For instance in formerly malarious parts of Brazil, British and French Guiana, Cyprus, Greece, Italy, Mauritius, Venezuela, the USA and Yugoslavia there has been a tremendous decline in malaria.

morbidity and mortality Malaria no longer occurs in Chile and seldom in Argentina In wide areas of Bombay and Mysore States in India and throughout Ceylon transmission has been almost completely interrupted by modern control and many other malarious countries can now point with pride to areas in which the disease no longer constitutes a public health problem However intense malaria is still found in certain parts of the Americas between 15°N and 15°S in Asia south of 40°N in Indonesia, in the south west Pacific and in Africa (see fig 6 page 44)

SOCIAL AND ECONOMIC CONSEQUENCES

Malaria is a chronic invalid producing disease which does not directly kill a high percentage of its victims although it is often a major cause of infant mortality The disease results in an increased number of deaths from other causes and lowers life expectancy but except in epidemic times it is insidious rather than dramatic in its effects Nevertheless over the centuries malaria has had a profound influence on thousands of communities throughout the world Whether or not as some historians assert it was decisive in the downfall of Greece and Rome and in the mysterious depopulations that left massive ruins in Polonnaruwa Ceylon and Angkor Wat Cambodia cannot be determined but there is ample testimony to the fact that malaria has been one of the great scourges of humanity because of its stunting of physical and mental development its notorious restricting of social growth, and its blighting of agriculture commerce and industry

Christophers¹ a most careful observer wrote in 1926

Whether from the point of view of enhanced mortality sickness and individual suffering or from

the effect of preventing natural increase and sapping the vitality of populations or the paralysing effect on industry and exploitation of the mineral or other natural wealth of the country or in the direct loss to Government in a variety of ways malaria is universally recognised as the most important sanitary problem with which India has to cope"

Sinton another keen student of malaria stated in 1936 also with regard to the disease in India

"The problem of existence in very many parts of India is the problem of malaria There is no aspect of life in this country which is not affected, either directly or indirectly by this disease It constitutes one of the most important causes of economic misfortune, engendering poverty diminishing the quantity and the quality of the food supply lowering the physical and intellectual standard of the nation and hampering increased prosperity and economic progress in every way"

Many other quotations could be given For example Sigerist the medical historian discussing malaria in the Roman Campagna commented that "the entire history of a landscape was determined by a single disease"

Effect on birth rate

Malaria affects a country's birth rate both by limiting the number of conceptions and by causing abortions and still births This is understandable in view of the predilection of malaria parasites for destroying red blood cells and for congregating in large numbers in the placenta Giglioli² reported that in British Guiana malaria reduced fertility and depressed the birth rate the latter in the presence of malaria control rose from 35.6 in 1946 to 44.3 in 1952 In Mauritius the birth rate went from 38.4 in 1946 to 48.1 in 1952 and in Venezuela from 37.6 in 1946 to 43.7 in 1952 in each case during a country wide malaria eradication project

Christophers, S. R. (1926) *R. p. Med. R. Worker Conf. for 1925* pp. 30-38 Quoted by Sinton, J. A. (1936) *Rec. Malar. Sur. India*, 5, 5-5

Sinton, J. A. (1936) *R. Malar. Surv. India*, 6, 159
Giglioli, G. (1948) *Malaria, filariasis and typhoid in British Guiana*, Georgetown, p. 65

Sometimes, however, malaria control is not accompanied by an increased birth rate, in fact, the number of births may decline. For example the change in Ceylon during a period of firm malaria control has been negligible—from 38.4 in 1946 to 39.5 in 1952. In Sardinia the rate of 26.9 in 1946 fell to 24.8 in 1952 and in Cyprus the 1946 rate of 32.4 dropped to 26.8 in 1952.

Effect on death rate

Malaria affects the death rate directly by killing about 1% on the average of those who have clinical attacks, and indirectly by lowering the resistance of the other 99%. In times of epidemics, large numbers may die of malaria. For example, in Mauritius in 1867 a malaria epidemic resulted in 6000 deaths in a single month in Port Louis, which had a total population of only 47 000. In the Punjab in October and November 1898 during an epidemic of malaria, there were recorded more than 307 000 deaths as compared with a normal average of 50 000 per month. The Ceylon epidemic of 1934-35 destroyed 80 000 lives in seven months' time. When *A. gambiae* invaded Brazil, it caused an epidemic that in six months of 1938 produced over 100 000 cases of malaria, with more than 14 000 deaths. Other instances could be cited but these are exceptions rather than the rule. For the most part, malaria has quietly but consistently lowered the vitality of a community without causing sufficient alarm to stimulate effective control.

Numerous observers have reported that an increased incidence in malaria is followed by a general increase in morbidity and mortality from other causes and the more widespread malaria is the greater the effect. When the rate of malaria prevalence falls if the disease has been common the general morbidity and mortality rates will concurrently decline.

The direct and indirect effects of malaria are more marked among infant and child populations. Infant mortality in India for instance, has long been known to be about twice as high in malarious districts as in relatively healthy areas. Bruce Chwatt⁴ reports malaria mortality rates per 1000 in Nigeria as 12.5 in infants, 7.0 in small children and 0.5 or less in older children and adults. Following malaria control in Mauritius, infant mortality dropped from an average of 150, in the period 1934-48, to 80.8 in 1952, and in Venezuela, the number decreased from 110 to 80 in four years of malaria control.

The three main causes of infant mortality are generally congenital and developmental defects, alimentary disturbances, and infectious diseases. Malaria contributes to all three. It also results in an initially lowered vitality of the infant, a diminished power of an infected mother to suckle her babies and a tendency towards general neglect of children if the mother is anaemic and weak from repeated attacks of malaria or has died of the disease. When a mother is debilitated she cannot carry out her normal maternal functions and if the father is also a malarious invalid unable to earn a full wage or to grow an adequate food crop then the offspring start life under a severe handicap.

General effects on health

Sinton quotes a 1919 editorial in *Public Health Reports*⁵. Competent investigators are of the opinion that the backward condition of school children in the coastal plains of the Carolinas is almost entirely due to the prevalence of malaria. And Sinton⁶ himself has written

The disease has a marked effect upon the nervous system and the mentality of the individuals afflicted

Bruce-Chwatt L. J. (1954) *Brit. med. J.* 1 169

Publ. Hlth Rep. (Wash.) 1919 34 546. Quoted in Sinton

J. A. (1935) *Rec. Malaria Sur. India* 5 425

Sinton J. A. (1935) *Rec. Malaria Sur. India* 5 43

with it. It is easy to see how a child whose early years have been marked by a succession of weakening attacks of fever will probably enter adult life with a debilitated constitution and an ill-educated mind. It cannot be expected that children suffering chronically from this disease will be mentally capable of obtaining that benefit from literary teaching or other training that healthy children would derive. Apart from the mental state, attacks of the disease will seriously interfere with their attendance at school. It is not difficult to understand how the combined effects of physical weakness and nervous debility must hinder the powers of concentration

and retard the normal development of the intelligence of such individuals."

Economic losses

Malaria undoubtedly results in severe financial and economic losses direct and indirect in any country where the disease is highly endemic. As an illustration of such losses one may cite Russell & Menon's⁷ malario-economic survey of a rural village in southern

⁷ Russell, F. F. & Menon, M. K. (1941) *Ind. med. Gaz.*, 77: 167.

FIG. 2. MALARIA IN INDIA



A woman with malaria awaiting treatment (Tala, India)

India, the annual payments per person to quacks, priests and doctors for the treatment of malarial fevers was equivalent to US \$0 80, and losses due to other money paid out and to cash wages not received because of malaria amounted to \$1 24 per person per year. Malaria could certainly be controlled in this village by pyrethrum spraying to kill adult anophelines for about \$0 08 per person per year. Few villages in India were on a much lower economic level than this one where the total annual income per person was equivalent to only \$11 26. Viewed simply as a matter of rupees and annas malaria was a burden to this village.

Malaria is an expensive visitor in any country. For example, Howard,⁸ a qualified observer, estimated in 1909 that malaria was costing the USA no less than \$100 000 000 per year and Williams,⁹ whose career has been dedicated to the understanding and control of malaria, estimated in 1938 that these annual costs had risen to \$500 000 000. Even now, when malaria is a rare disease in the USA, it still levies an enormous hidden tax on the people because imports such as basic minerals, hardwoods, coffee and cocoa, vegetable oils, waxes, and certain fruits which come from the malarious tropics are priced at least 5% higher than they would need be if it were not for the cost of malaria control—or lack of control—a greater expense—in the exporting countries, and because the market for every item of export to the tropics must naturally be smaller if malaria constitutes a heavy local financial burden on the people themselves and on their governments.

Balfour & Scott¹⁰ calculated in 1924 that the direct annual cost of sickness and death due to malaria in India was between

£50 000 000 and £60 000 000, and Sinton put the figure at £80 000 000 quite apart from indirect losses. What the latter involve can be imagined in the light of Ross's¹¹ statement, in 1910:

Malaria is the great enemy of the explorer, the missionary, the planter, the merchant, the soldier, the farmer, the administrator, the villager and the poor and has I believe modified the world's history by tending to render the whole of the tropics comparatively unsuitable for the full development of civilisation.

Some recent examples of the economic aspects of malaria are of interest. For instance, in an epidemic of malaria in southern Egypt in 1942-43, one plantation alone suffered a monetary loss equivalent to \$600 000 because most of the labourers were prostrated with chills and fever and were unable to harvest half of the wheat and a third of the sugar cane crops. Several similarly striking illustrations were presented to the First Asian Malaria Conference, held in Bangkok in 1953.¹

Mention might also be made of the numerous ways in which governments sustain financial losses because of malaria. For example, there are diminished revenues from taxation, greater expense for medical care, higher salaries and wages demanded for serving in unhealthy areas, slower development of natural resources, impaired intellectual leadership and retarded social development.

Hoffman¹² in 1926 summed up the economic aspects of malaria control thus:

The cause of malaria eradication therefore rests upon sound economic as well as self-evident humane considerations, leaving no escape from the final conclusion that the entire subject most urgently demands the qualified and intelligent co-ordination of all existing governmental agencies and related

⁸ Howard, L. O. (1909) *Bull. U.S. B. Ent.* No. 78. Quoted in Sinton, J. A. (1935) *Rec. Malar. Surv. India* 5: 477.

⁹ Williams, L. L. Jr (1938) *N. J. Med. Extern. Ass.* 25: 148. Quoted in Boyd, M. J. (1949) *Malariology* (Philad. lpha), vol. 2, p. 1387.

¹⁰ Balfour, A. & Scott, H. H. (1924) *Health problems of the Empire*. London. Quoted in Sinton, J. A. (1935) *Rec. Malar. Surv. India* 5: 48.

¹¹ Ross, R. (1910) *The prevention of malaria*. New York. Quoted in Sinton, J. A. (1935) *Rec. Malar. Surv. India* 5: 431.

¹² Chan, W. H. H. *Org.* 1934: 117.

Hoffman, F. L. (1926) *Malariology* (Philad. lpha), vol. 2, p. 1387. Quoted in Sinton, J. A. (1935) *Rec. Malar. Surv. India* 5: 437.

health-conserving activities on the one hand and a broad-minded public policy on the other with specific reference however to the expenditures on behalf of local anti malarial measures on the part of

the general public. For economic reasons alone, the effort would be worth while, since the economic results of effective anti malarial measures are a foregone conclusion."

METHODS OF CONTROL

OLD AND NEW METHODS

Malaria control has four principal historical roots—drainage, drugs, larvicides and adulticides.

Drainage

The use of drainage to control malaria is a method that was first employed by engineers in ancient Rome. Although the construction of drains at that time was almost entirely for agricultural benefit, there are definite references in contemporary reports to some expectation also of relief from marsh generated fevers. Vitruvius, for instance, wrote "When the marshes are stagnant and have no drainage they become putrid and emit vapours of a heavy and pestilential nature." Many attempts were made to drain the Pontine Marshes beginning at the time of the Caesars, but success did not come until 1940 when the last great scheme was completed. This made possible the reclamation of about 200,000 acres of farmland supporting more than 50,000 people in an area where in 1930 not a single permanent household could be found.

At the beginning of the twentieth century there were extensive antimalarial drainage projects in many places, as widely separated as New York and Sierra Leone, Brazil and Hong Kong, and there followed a gradual but vast increase in such drainage up to the period of the Second World War. Particularly effective malaria control by subsoil drainage was accomplished in Malaya by

numerous workers—Watson in 1901 followed by Evans, Hunter, Scharff and others.

Drainage, however, is often expensive and by itself seldom gives full control of malaria, particularly in areas where the vector finds canals and ditches to be suitable breeding places. Today, as in ancient Rome, the chief usefulness of drainage is in the reclamation of land, not in malaria control.

Drugs

Attempts to prevent malarial illness by taking prophylactic drugs date back to at least 1768 when Lind recommended infusions and tinctures of cinchona bark for this purpose. Since the time when the alkaloid quinine became available soon after its isolation in 1820, it has been widely used for malaria prophylaxis, but it has never had more than partial success.

The factors involved in the use of drugs to prevent malaria were at first not clearly realized. A better understanding of malaria has made it apparent that protective chemotherapy or drug prophylaxis has several forms. It may consist of an attack on the sporozoites or on the pre-erythrocytic stages. Thus, if successful, is *true causal prophylaxis*. The action of the drug may be on the multiplying forms in the red cells. Such *schizont blockage* is suppressive treatment or *suppressive protection* that does not necessarily eradicate the parasites but does prevent them from reaching a density sufficient to cause clinical symptoms. If the parasites are eliminated, the result constitutes *suppressive*

FIG 3 EARLY USE OF CINCHONA BARK IN TREATING MALARIA



(Photo by courtesy of Professor P. Alonzo Super
Intendent of the Sto Spirito Hospital Rome)

The introduction of Cinchona bark into the Sto Spirito Hospital in Rome by Cardinal De Lugo

cure Finally, by attacking gametocytes a drug may render a malaria carrier non infectious to mosquitos even if it does not destroy all the parasites

Quinine does not affect any exo ery throcytic stages is not very active against gametocytes and disappears so quickly from the blood stream that when given prophylac tically, it often does not effectively control the schizonts

Other antimalarial drugs are mepacrine (Atabrine) chloroquine (Nivaquine B or

Aralen) amodiaquine (Camoquine) pro guanil (Paludrine) and pyrimethamine (Daraprim) Mepacrine which was syn thesized about 1930 was extremely useful during the Second World War It was found that 0.1 g per day consistently prevents clinical symptoms of all types of malaria and in addition usually gives suppressive cure of falciparum malaria and occasionally of vivax However there was a high percentage of relapsing vivax malaria when the medication was stopped Also the drug has certain

disadvantages it sometimes has undesirable toxic by-effects and it temporarily causes a colouration of the skin. Chloroquine or amodiaquine taken once a week in doses of 0.3 g or 0.4 g of base respectively give excellent suppressive protection against all types of malaria with suppressive cure in most falciparum and some vivax infections and with a minimum of by effects. Proguanil has been fairly widely used as a suppressive drug. Pyrimethamine is still under field trial.

Both proguanil and pyrimethamine have been reported to have induced a marked drug tolerance in the plasmodia in certain areas and thus resistance to the drugs has been shown to remain even after the parasite has had several passages through vector mosquitos. Such resistance has not been noted with regard to any of the other drugs.

Apart from the question of drug resistance suppressive treatment of malaria is much more promising than heretofore. Nevertheless except where relatively few cases are involved it has not yet been shown that

malaria can be eradicated from the average infected community solely by the use of drugs. In all but exceptional conditions malaria control by antimosquito measures is still cheaper and more effective than medication. Modern synthetic antimalarials are however of great help as adjuvants in contemporary campaigns to eliminate malaria.

Larvicides

The earliest record of the use of larvicides to control mosquitos appears to be a note in Dunlap's American Yearly Advertiser Philadelphia 1793. In this case "common oil (whale oil)" was used to kill larvae found in rain water casks. Petroleum oils began to be used against mosquitos in the nineteenth century and were applied to breeding places on an enormous scale in malaria-control operations from 1900 onwards. They still have much usefulness under special conditions but have been found unnecessary in malaria control wherever the

FIG 4 SEARCHING FOR MOSQUITO LARVAE



Fishing for mosquito larvae (Malabar India) part of the entomological work in modern malaria control

anopheline vectors can be destroyed by adulticidal sprays

Powdered larvicides were apparently first used in the form of Paris green, by Marston, in New Orleans early in the twentieth century. The first comprehensive experiments were performed by Barber and Hayne in 1921. Thereafter until the end of the Second World War, Paris green was used in tremendous quantities in many parts of the world, distributed by hand by various types of dusting machines and by aeroplanes with great success against anopheline larvae. But as in the case of oil, Paris green has much less usefulness today, because experience has shown that malaria control is more effective and economical when the adults of the vector are attacked rather than the larvae.

Adulticides

The first method of mosquito control used by man was perhaps, the destruction of adult mosquitos by hand. This was one of the measures employed systematically by Gorgas and his colleagues during the construction of the Panama Canal: the labourers' quarters were regularly visited by men whose job it was to kill as many of the resting adult anophelines as possible. Other measures directed against adult mosquitos, such as the use of bed nets and screens and the application of repellents to the skin, have been and still are important aids to individuals in malarious places.

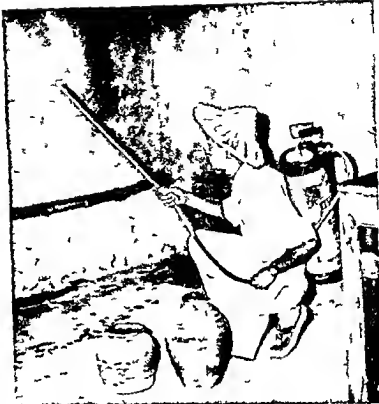
Killing adult mosquitos has become the most effective and most widely used method of controlling malaria, and adulticidal sprays have proved the most satisfactory means of achieving this purpose. The first mosquito spray to have wide application was a petroleum oil extract of pyrethrum. Park Ross and De Meillon made the earliest practical use of this adulticide in communities in South Africa, as reported at the Pan African Health Conference of the Health Organisa-

tion of the League of Nations in November 1935. They obtained excellent results by systematic house to house indoor spraying. De Meillon pointed out that the whole idea underlying malaria control by anti adult measures is that "it is not intended to destroy all *A. gambiae* but only those which are infected which past experience has shown are largely to be found indoors". He also noted that the cost of anti adult spraying was about a third of that of the less effective antilarval control.

Experiments with similar pyrethrum spraying in India confirmed its usefulness against those malaria vectors that, like *A. culicifacies*, rest for the most part indoors in the day time. Costs of this type of malaria control were found to be amazingly low—less than US \$0.10 per person annually under typical rural south India conditions. During the Second World War, much use was made of this type of prophylaxis: no fewer than 40 million 1 lb aerosol pyrethrum bombs were supplied to the Allied Armed Forces.

DDT (dichloro diphenyl trichloroethane) was synthesized by Zeidler in 1874 but remained obscure until 1936-37, when Paul Muller, in Switzerland, discovered that it was an amazingly effective insecticide—an observation for which he received a Nobel Prize. The special importance of DDT derives from the fact that it has a prolonged residual killing effect on many insects when it is sprayed on surfaces upon which they later walk or rest. DDT does not kill mosquitos more quickly than pyrethrum but unlike the latter it continues to kill for months after it has been applied to surfaces in suitable formulations. Using DDT sprays one does not have to hit insects directly with spray particles to kill them: it is anticipated that a significant number of malaria vector mosquitos will rest on the DDT treated surface at some time during the period of ten days or more required for the development of infective sporozoites. Particles of the toxicant

FIG 5 MALARIA CONTROL
BY RESIDUAL ACTION
ADULTICIDES



Spraying with DDT in
Tet an

cling to the feet of the insect which may also transfer them elsewhere on its body. The poison penetrates the cuticle and is absorbed with fatal results. Other useful insecticides having similar residual action are benzene hexachloride (BHC), chlordane and dieldrin.

All four of these adulticides have been used to control *Anopheles*. There is probably no malarious country today in which one or another is not being employed against malaria in many cases with complete success.

However the spectre of insect resistance to the residual toxicants which will be discussed later (see page 90) is now a matter of concern. High percentages of the local populations of certain species of house flies, *Culex* mosquitos and certain other noxious

insects in a number of areas are not now killed by the insecticides mentioned above. In some cases flies have become highly resistant after one to three seasonal sprayings with DDT. Moreover when resistant to one of the chlorinated hydrocarbons flies quickly become tolerant to the others.

One malaria vector *A. sacharovi* has begun to show such a tolerance to DDT in Greece that in some areas residual spraying with this chemical can no longer be recommended for control of malaria carried by this anopheline. In parts of Lebanon the same species seems to be developing resistance after only two years of DDT spraying. Another malaria vector *A. albimanus* in Panama has developed a tendency to avoid DDT treated surfaces contrary to its behaviour at

FIG 6 PRESENT STATUS OF MALARIA CONTROL, BASED MAINLY UPON USE OF RESIDUAL INSECTICIDES



□ Territories which were free of malaria before 1946

⊠ Territories where malaria transmission is precluded because of altitude or desert conditions

◻ Malarious territories

◻ Territories which were malarious before 1946 but from which malaria has now been eliminated

◻ Territories which were malarious before 1946 but in which malaria morbidity has been drastically reduced

○ Malaria-control operations by residual insecticide spraying now under way

● Plan aiming at nation-wide malaria-control now being implemented

Chile was the first country to eradicate malaria in the small area where the disease was present but by antilarval work, before DDT

This map does not claim to be complete. Statistics have not been included for all countries in the USSR in the People's Republic of China and

first. While only one or two other *Anopheles* species have shown resistance or behaviour changes of practical importance following DDT spraying the possibilities of the development of such resistance are of great significance in malaria control. Although this resistance to DDT may develop in house flies after only a year or two of spraying it is usually slow to appear in *Anopheles* mosquitoes. If a country wide malaria-control programme by residual spraying is systematically pushed to completion in a matter of seven or eight years there is not much chance of failure because of insect resistance to the toxicants.

The sorption of insecticides by certain types of mud wall surfaces is another problem that complicates the use of residual DDT (see page 87).

A final comment on adulticides is that when malaria transmission has been ended in an extensive area it seems reasonable to believe that the spraying can safely be discontinued provided adequate provision is made to detect promptly the appearance of malaria derived from imported cases or neglected foci (see page 92).

MALARIA ERADICATION

In the past except in areas of low or restricted incidence it has been necessary for economic and technical reasons to set up as the objective of malaria control amelioration rather than eradication, hoping that in time the maintenance of effective measures might result in the disappearance of malaria. This hope was reasonable in countries with climatic conditions unfavourable to the transmission of malaria but it was Utopian in the tropics. Now however it has become possible to think more and more in terms of malaria eradication regardless of the latitude involved.

The term "malaria elimination" or "malaria eradication" should not be con-

fused with the expression "vector eradication". The latter method of malaria control aims at complete extirpation of vector species from given areas and it is not an economically feasible proposition except under unusual conditions. *Anopheles gambiae* for example was completely destroyed in north-eastern Brazil after it had invaded that country from Africa and the same invader was driven out of southern Egypt. In neither case was malaria due to other anopheline species eliminated. However vigorous attempts to extirpate indigenous anopheline vectors from Cyprus and from Sardinia eliminated malaria but failed to destroy all the anophelines in spite of exceptionally strong antimosquito organizations and ample funds.

In certain small areas with effective natural barriers stable vector eradication might be achieved at a reasonable cost. But in the average malarious country it appears to be much cheaper to aim at eradicating malaria by residual spraying not being concerned about the mosquitoes that remain. In the absence of gametocytes the persisting mosquitoes cannot transmit malaria. In some instances residual spraying has apparently eradicated certain species of vectors without any special attempt being made to do so for example *A. darlingi* in most of Venezuela and British Guiana, and *A. labranchiae* in the Pontine Marshes area have disappeared during residual spraying.

A country wide energetically applied, residual spray programme may be expected on the basis of recent experience to bring about the eradication of malaria in most countries in seven or eight years. For instance in 1953 in Italy after systematic spraying with DDT since 1946 there were only 12 cases of indigenous malaria (primary or relapses) reported—an amazing contrast to the 303 007 malaria cases reported in 1919 and the 411 602 cases reported in 1945.

In some communities it may be advisable

to supplement residual spraying with selective treatment of those who have relapsing malaria. Exceptionally, gametocyte carriers may also be sought out and treated. In *prima*

quine there is now available an antimalaria drug that, administered under proper supervision, will in many cases completely free the body of plasmodia.

NATIONAL AND INTERNATIONAL ACTION AGAINST MALARIA

The new weapons in malaria control—residual insecticides and new antimalarial drugs—have made feasible and even essential, control campaigns on a scale larger than would have been thought possible fifteen years ago. Since the Second World War, most malarious countries have embarked upon extensive malaria control programmes in many instances with international or bilateral assistance. This assistance has taken the form of technical guidance and financial aid in actual control operations, and also in the case of help from WHO of training personnel for malaria work and promoting the exchange of knowledge of modern malaria control methods.

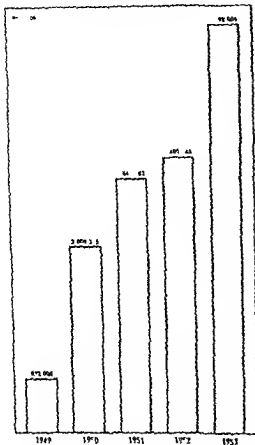
The sections which follow give an account of some of the considerable accomplishments in recent years in national and international efforts to control malaria and describe the part that WHO is playing. The success of international assistance in malaria control is measured not merely by a decrease in the prevalence of the infection but also by the continuation of control measures by the health administrations concerned after international aid comes to an end. It will be noted that all the governments have continued, and even extended the malaria-control measures initiated with international help and that in most countries nation-wide programmes have been developed. This continuity as well as the efficiency of operations, is dependent upon the existence of an adequate malaria control organization within the country, and aiding in the establishment

or strengthening of such organizations is one of the essentials of international assistance.

WHO and UNICEF co-operate in many malaria-control schemes, the former providing technical advice and the services of expert personnel, and the latter furnishing insecticides, spraying equipment, transport, and other necessary supplies. Since 1951 Technical Assistance funds have enabled the Organization to provide equipment and supplies as well as personnel for some projects but for the most part, WHO depends on the governments concerned and on UNICEF for the materials necessary for malaria control. Besides the projects in which UNICEF assists governments by giving supplies and equipment and WHO by assigning personnel there are a number of national antimalaria programmes which are benefiting largely from UNICEF's material assistance and which have been established according to plans having the technical approval of WHO. This is the case for some countries in Asia, for some territories in Africa and particularly for numerous countries in Latin America.

The United Nations Food and Agriculture Organization (FAO) has participated in some WHO technical meetings on malaria. Malaria control is often a prerequisite for the adequate production of food in parts of the world the disease interferes greatly with agriculture by impeding the development of uninhabited and fertile areas and by reducing the working capacity of the rural population.

FIG 7 NUMBER OF PERSONS DIRECTLY PROTECTED IN WHO-AIDED MALARIA CONTROL PROJECTS 1949-53

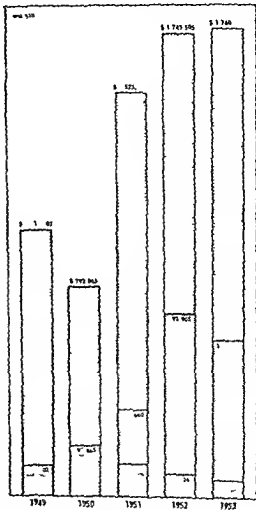


This graph does not include populations protected by national malaria-control projects after the withdrawal of international personnel. Some of the figures included for the Region of the Americas and for malaria control among the Palestine refugees (UNRWA operations) are provisional.

Valuable support in malaria-control programmes is also given by other agencies particularly those concerned with bilateral technical assistance. In a number of countries—India, the Philippines, Viet Nam and Taiwan for example—USA bilateral assistance is supporting national malaria-control

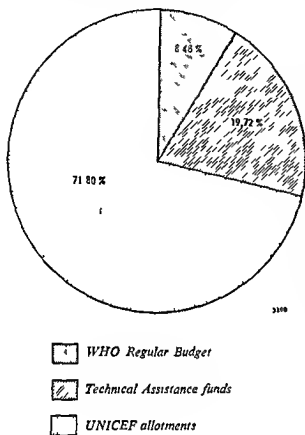
projects with expert personnel, equipment and supplies. Where WHO teams are also assisting, the two agencies co-operate, each making use of the findings of the other.

FIG 8 ANNUAL INTERNATIONAL EXPENDITURES FOR MALARIA CONTROL 1949-53



WHO Regular Budget
 Technical Assistance funds
 UNICEF allotments

FIG 9 SOURCES OF INTERNATIONAL FUNDS FOR MALARIA CONTROL, ON A PERCENTAGE BASIS, FOR THE PERIOD 1949-53



especially with regard to malaria epidemiology and the usefulness of residual insecticides and methods of application

A critical problem in malaria control is assuring a free flow of insecticides and equipment for applying them from producing countries to those which have need of these items. This problem has been the subject of action by the Economic and Social Council of the United Nations which has helped to assure that the necessary quantities of insecticides are made available to governments requiring them. In addition through the collective efforts of the United Nations, WHO and UNICEF, an attempt has been made to promote the regional production of insecticides with WHO technical guidance, UNICEF financial aid and funds from Technical Assistance, DDT producing plants are nearing completion in Ceylon, Egypt, India and Pakistan¹.

The number of persons protected and the countries concerned in WHO assisted malaria control projects carried out in many instances with UNICEF collaboration, over the five year period 1949-53 are illustrated in fig 7 and 10. Also shown (fig 8 and 9) are expenditures for this work and a breakdown according to the source of funds.

CONTROL CAMPAIGNS

The chief instrument in WHO's field activities in malaria control is the expert team of which there are two types—the advisory team and the malaria control demonstration team.

The former, at the request of governments which have decided to embark upon large scale programmes are sent to assist in making malarial and entomological surveys, planning projects, strengthening malaria organizations and training personnel. They are not provided with operational equipment or supplies since their role is largely one of

technical guide and they are generally sent to the capital of the country so that they can work with the central public health administration.

Demonstration teams on the other hand are provided with their own equipment and transport and work in selected areas of high malaria endemicity where they demonstrate modern methods of malaria control at the lowest feasible cost, assess the results, train local personnel and advise upon

¹ See Ch. VII, H. H. O. g. 1951 7 3 7. WHO aid in this project came to an end in July 1953.

government. As the opposite numbers become thoroughly trained they gradually assume responsibility for the work.

The same methods of survey and evaluation are followed by practically all the teams in the interests of achieving uniformity in the collection of data and making possible accurate appraisal and comparison of data from different countries. Arrangements are always made to have a comparison or check area, which is left unsprayed but which is subjected to the same observation as the area where spraying operations have been carried out.

Malariometric data are collected for children (separated into two groups 2-4 and 5-9 years), and great attention is paid to infant parasite rates. In order to obtain

statistically significant samples an attempt is made to examine a minimum of 10% of all children between 2 and 10 years of age—possibly 20% for spleen rates. In addition monthly infant parasite rates are taken in selected villages and in the same villages or in others the course of malaria morbidity is studied by periodic visits during which all cases of fever are registered and the blood of the patients examined. Generally, surveys of adults are undertaken only when their malariometric rates are useful in characterizing the type of malaria endemicity.

The procedures for obtaining and recording entomological data are similarly standardized. Stations for collecting imago and larvae are established as part of every project, and dissection of mosquitos is carried out to



FIG 11 MALARIO-METRIC SURVEY

Examining children for determining spleen rates (Thailand)

determine the vector and define the season of transmission. Outlet window trap catching in sprayed and unsprayed houses though tried everywhere has not always proved successful.

Team members are also responsible for the collection of meteorological and other relevant data such as information on health conditions in general and prevalence of insect borne diseases in particular on environmental sanitation and if possible on social economic and agricultural conditions.

Information on spraying operations is recorded in a uniform manner by each team as follows

Summary (1) number of villages sprayed (2) number of houses and/or structures sprayed (3) number of rooms and compartments sprayed (4) population directly protected (i.e. number of individuals residing in sprayed houses) (5) superficial area sprayed in square metres (6) DDT used in terms of technical grade DDT kilograms as wettable powder as emulsion or as solution (7) technical DDT sprayed average grams per square metre (8) number of workers including squad leaders (9) man hours worked squad leaders and others (10) man hours of disinfestors (11) number of hours spent travelling (12) area of operations square kilometres (13) date spraying started (14) date spraying completed (15) total number of working days employed (16) types of sprayers used (specifying also type of nozzles)

Analysis (1) average number of rooms and compartments per structure (2) average superficial area sprayed per structure in square metres (3) average number of inhabitants per structure (4) DDT technical grade used per structure grams (5) man hours labour per structure (including squad leader) (6) disinfestor man hours per structure (7) average superficial area treated per person protected, square metres (8) superficial area treated per man hour including squad leader in square metres (9) superficial area treated per man hour of disinfestor square metres (10) technical DDT used per person protected grams (11) proportion of time spent for travel to total time of operations

An evaluation of the costs of spraying operations is an important part of the teams work so that governments may be able to estimate how much it will cost them to repeat



Searching for adult mosquitos in outlet window-traps (Philippines)

the operations. The analysis of expenditures includes

- (1) cost of labour employed for the actual spraying
- (2) equipment in terms of its depreciation the yearly depreciation generally suggested being as follows: vehicles 24 (2% per month) bicycles 30% sprayers 25% other items 5% to 30%
- (3) supplies
- (4) transport (operation and maintenance for the work related to the actual spraying operations)
- (5) supervisory staff (The number of personnel in the national supervisory staff should be based on the actual requirements in the area of operations. If the size of the supervisory staff employed in the project was such that it could have covered a popula-

tion greater than that in the demonstration area the salaries are pro-rated to obtain the amount corresponding to the services rendered to the population in the area of operations. The salaries should be computed in conformity with the prevailing national schedule)

(6) miscellaneous expenses

This information too, is recorded uniformly by all WHO teams

There follow brief histories of some of the WHO malaria control demonstrations

Afghanistan

Very little was known, or done about malaria in Afghanistan before 1949 when, at the request of the Government, WHO sent a malaria survey team for a short term assignment beginning in May of that year. Three months later a small demonstration team made a quick preliminary survey of the hyperendemic malaria area of Laghman Jala labad province and then proceeded to carry out the first residual spraying of houses, protecting about 13 000 persons. *A. superpictus* and *A. culicifacies* were both found infected in the area.

The project was very successful, and the Government took it over in 1950. WHO personnel was sent to another area, in northern Afghanistan for a full demonstration project. In this instance, the Organization provided equipment and supplies as well as a team. The area selected for the demonstration was in the province of Katagan and contained the two districts, or *hakumati* of Khundus and Khanabad.

A preliminary survey showed spleen rates ranging from 25% to 33% in the Khundus area and exceeding 50% in Khanabad town and surrounding villages. parasite rates averaged 8.9%. During the whole period of activity of the team, thousands of dissections of the two main anophelines believed to be vectors *A. superpictus* and *A. pulcherrimus*, failed to show any *pulcherrimus* infected while *superpictus* was repeatedly found with sporozoites.

Houses were mud built and large with the sprayable surface area per person being about 70 m². The first year, approximately 45 000 persons were protected. In the second year, 1951, it was already known that the transmission season in Katagan lasted about three months, from the last part of July until the end of October, and it was decided that, in the area which was going to be sprayed before 15 June, 2 g of DDT per m² should be applied, but that in the area to be sprayed later, 1 g per m² would be sufficient. In addition, a small area was to be sprayed with only 0.5 g per m², and here the operations were to be repeated six weeks later. The 1951 spraying was carried out according to this scheme and lasted from 10 May to 22 July, with the second round of 0.5 g per m² being applied in August.

It was found that, owing to the large sprayable area, the overall consumption of technical DDT per person per year was 93 g and the cost per person protected equivalent to US \$0.20, it was also found however that in future a single application of only 1 g of DDT per m² would be sufficient.

The results after two years spraying were very satisfactory. Approximately 150 000 persons were protected in 1951. The spleen rate decreased by 24.8% in the sprayed area while it increased 18% in the unsprayed check area. the parasite rate dropped from 8.9% to 0.8% while in the check area it rose from 11.8% to 13.1% and the infant parasite rate became nil while it was still 15.2% in the check area. There was a remarkable decrease in clinical malaria and in anopheline density in the sprayed area.

Progress had also been realized in establishing malaria control services: a nucleus organization had been formed, and a malaria institute was being set up.

In these two years the WHO team while devoting its activity only to malaria control in the appropriate season stayed in Kabul during the winter and gave training courses

for malaria personnel and sanitary inspectors and instructed school teachers in hygiene. It also assisted in antityphus operations in Kabul and Kandahar.

Towards the end of 1951 the original malaria-control demonstration was terminated and a national malaria-control campaign was being planned with WHO personnel acting in an advisory capacity. The Government requested assistance from UNICEF for the national campaign.

The nation wide scheme starting from a level of 675 000 persons protected in 1952, and with progressive yearly expansion rendered possible by UNICEF's contributions aims at protecting all the population of the endemic areas (about two million persons) in 1955. In 1953 274 000 persons were protected in addition to those already covered by the 1952 operations—a total of more than 949 000. UNICEF contributed US \$22 000 and the national budget for malaria control was the equivalent of US \$165 000. It is understood that UNICEF proposes to continue its assistance in 1955 and to maintain it on a decreasing scale from 1956 to 1958. The costs of the campaign are gradually decreasing in one province where the sprayable area is large the cost per person in 1953 was US \$0.15 in another province with a smaller sprayable area it went down to \$0.083.

An interesting feature of the organization of the nation wide plan is that the post operational surveys are carried out independently that is by teams which were not responsible for the relevant control operations. In 1953 there were seven such teams in the field each composed of a medical officer and three technicians. The malaria organization was well established by the end of the year comprising in addition to its president 6 medical officers 1 entomologist and 49 technicians all adequately trained and already manning a number of teams operating in the country. Furthermore the malaria

institute was almost completed partial occupation of the building having begun in December 1953.

Burma

A malaria-control demonstration began in Burma in October 1951 when a WHO international team arrived in Lashio capital of the Northern Shan State. Equipment and supplies for the work were provided by the Government with bilateral assistance from the USA up to 30 June 1953 and from UNICEF after that date.

The area chosen for the demonstration was hyperendemic. Houses were built on bamboo poles and were made of bamboo mats and thatched roofs. The first survey started in December 1951 showed in the rural areas spleen rates of about 90% a parasite rate of 27% and an infant parasite rate varying from 31% to 35%.

Of 23 species of anophelids present only *A. minimus* was found infected sporozoites were found in its salivary glands during all months except April and May. It was discovered that *A. minimus* preferred houses to cowsheds and that in houses most of them (80% 90%) rested on the walls at a height lower than a metre. This indicated a need for experimenting with selective spraying methods and several were tried.

The first spraying took place from 17 March to 13 May 1952 and 55 267 persons were protected. A second spraying between 8 January and 23 March 1953 protected 110 429 people. During this cycle spraying operations were based upon the results of previous trials and most of the area was sprayed with 2 g of DDT per m² applied to all interior surfaces only one sector with 14 000 inhabitants was still sprayed by a selective method up to about 2 m and using the same dosage. Cattle sheds were not sprayed anywhere. The third spraying cycle

was from 3 January to 25 February 1954 and 114 288 persons were protected

The results were satisfactory, as can be seen from the following data

	Spleen rate (/)	Pa asite rate (/)	Infant pa asite rate (/)
1 Area first sprayed in 1952 and 1953 2 g DDT per m ²			
Pre-spraying survey (1951 Jan 1952)	90	26.5	35.2
	FIRST SPRAYING		
Second survey (Dec 1952 Jan 1953)	66.6	3.7	0
	SECOND SPRAYING		
Third survey (Dec 1953 Jan 1954)	12.1	5.8	0
2 Area first sprayed in 1953 2 g DDT per m ² (comparison area in 1952)			
Pre-spraying surveys (1951 Jan 1952)	90	25.6	41.2
(Dec 1952 Jan 1953)	82.5	43.4	46.0
	FIRST SPRAYING		
Post spraying survey (Dec 1953 Jan 1954)	50.2	15.3	9.2
3 Areas sprayed with various types of selective spraying in 1952 all with 2 g DDT per m ² up to about 2 m in 1953			
Pre-spraying survey (1951 Jan 1952)	88.5	94.5	179.33
	FIRST SPRAYING		
Second survey (Dec 1952 Jan 1953)	64.8	70.3	6.814
	SECOND SPRAYING		
Third survey (Dec 1953 Jan 1954)	0.8	6.0	2.6

It is apparent that selective spraying (i.e., houses only up to about 2 metres) and no treatment of cowsheds gave results comparable to those obtained by spraying all inside wall surfaces

The average cost per person protected was the equivalent of US \$0.232 and \$0.238 in 1952 and 1953, respectively

It was found that on the type of wall common in the area DDT at 2 g per m² remained active against *A. minimus* for at least thirteen months. The vector species was practically absent in the sprayed area. In February 1954 no *A. minimus* were found during 158 man hours of day time searching (nor in 17 whole night collections) in houses of the sprayed areas, whereas, in unsprayed villages 9.8 were found per man hour of search. Larval density was also greatly reduced (50%).

Throughout the project work in environmental sanitation and community organization was successfully carried out.

In 1952, the senior adviser of the WHO team drew up with the relevant Government and bilateral assistance representatives a five year plan for the control of malaria in all the endemic areas of Burma. In April 1954 the Government took over the Lashio area as part of a national malaria control programme and WHO personnel were transferred to a new project in Maymyo where emphasis was put on training personnel to be employed for the nation wide programme. The latter which is assisted by UNICEF, provides for the protection of 2.7 million persons in 1954 and by 1957 of all the 7.5 million people of Burma who are exposed to malaria.

Cambodia

Assistance in malaria control to Cambodia began with the sending of a malaria adviser from October 1950 to May 1951. A few months later in August, a team consisting of a malariologist and a public health sanitarian started a malaria-control demonstration which lasted until March 1953. The Government assigned to the project as opposite numbers a medical officer and a supervisor.

It was known that the main vectors were *A. minimus minimus* and on the littoral,

4 *s. sandicus* and that transmission probably occurred during all twelve months of the year. Still the lack of an entomologist national or international was a serious handicap to the proper working of the project.

Even more serious were the political conditions of the country. The demonstration area was composed of four non-contiguous zones distributed in the provinces of Takeo, Kampot, Siemreap and Kompongcham. Three comparison areas were established at the beginning of the project but one later proved unsuitable, another had to be abandoned because security reasons made it inaccessible and the third with a population of 5600 was somewhat too small to provide statistically significant data. Political and military conditions made it impossible to select the most suitable areas for the demonstration so that only those areas that were safely accessible could be selected. The same conditions dictated sudden transfers of population. Villages that had been sprayed became invaded by refugees who set up huts in great numbers thus affording, without the knowledge of the team, unsprayed premises where vectors could survive.

The spraying operations were carried out twice a year. The senior adviser believed that this repetition was necessary (1) during the dry season because of deposits of heavy red dust on the surface of the walls which are generally (in about 70% of cases) made of palm leaves with or without split bamboos and (2) during the rainy season which lasts six months because water would leak along the inner walls and these are often replaced by new layers of palm leaves. DDT was used at theoretical doses of 2 g per m². Costs were high: the equivalent of US \$0.427 per person protected per year (for the two sprayings). The surface to be sprayed on a per person basis was not too large but the population density was very low—an average of 20 per km² in malarious areas and only 5 per km² in some places.

Epidemiological study and assessment of results of this project were necessarily reduced to a minimum which explains the sparsity of items in the following summary which gives the total data for the demonstration area in the four sectors.

	Pre-operational survey	Post-operational survey
Children (2-14 years)		
Number examined	1090	1458
Spleen rate (%)	57.4	25.8
Number examined	778	1360
Parasite rate (%)	33.1	16.4
Infants		
Number examined	130	117
Parasite rate (%)	6.2	8.4

At the end of the demonstration the Government requested its resumption. Thus a third phase of WHO assistance to the Government of Cambodia started in August 1953 when two malaria experts arrived in Phnompenh. A new demonstration area with a suitable comparison area was chosen in the "srok" of Snuol Kratie. The rest of the country wherever possible is to be surveyed and malaria-control operations are to be carried out in all areas where the spleen rate exceeds 10%. A single yearly spraying is being tried.

China (Taiwan)

Malaria is a serious problem in Taiwan: it is estimated that 10% of the population—i.e. about 800 000 persons—suffer from it yearly. In an overpopulated country like Taiwan where there is an excess of labour and where no arable land is left uncultivated it is difficult to investigate economic conditions related to malaria alone. However a survey intended to determine the economic losses caused by a malaria epidemic in Kao Hsu township revealed that it cost 5256 persons the equivalent of US \$17 500 within four months for treatment, loss of labour

doctors' fees, and other relevant expenses—a sum equal to nearly five and a half times the cost per person of a yearly spraying with DDT (figured at \$0 175 per person protected)

A WHO aided project, planned for four years started on 15 May 1952 with a team consisting of a malarialogist, an entomologist and a public health engineer, and a certain amount of supplies furnished by the Organization through Technical Assistance funds. The Government appointed as counterparts to the international staff the present Director of the Provincial Malaria Research Institute in Ch ao Chow, where the headquarters of the team is located 4 other malarialogists, 3 engineers 14 technicians for parasitological and entomological activities 14 field supervisors and the necessary administrative and operational personnel

In the same year, 1952 a nation wide "Four Year Malaria Eradication Pro

gramme was adopted. This programme is being implemented by the Government, through the aforementioned malaria institute, with substantial financial assistance from the Foreign Operations Administration (FOA) of the USA and with technical assistance and some financial help (in 1952 and 1953) from WHO.

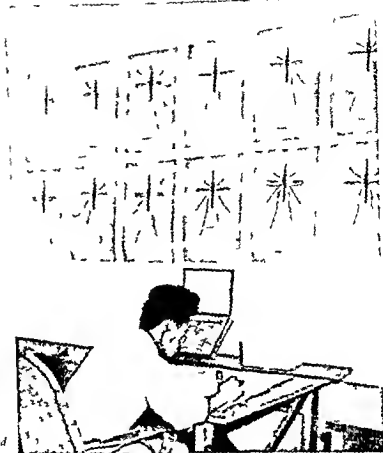
The WHO demonstration area consisted of the Chi Shan district of Kaohsiung prefecture, near Ch ao Chow, where spleen rates among children varied from 17.27% to 100%. The vector species were *A. minimus* and, less frequently, *A. hyrcanus sinensis* though no specimen of the latter was found with infected glands by the project entomologists. A sector of the district was left unsprayed as a control.

During the first spraying cycle (14 July 28 September 1952) 37 282 people were protected in the highly malarious district of Chi Shan. In addition, six townships around Ch ao Chow were sprayed. In all 156 217

FIG 13 MAL
ARIA CONTROL
IN TAIWAN—I



Reading of blood
samples in the
Taiwan malaria
control project



Identification of captured ophielines in Taiwan

persons were protected at a cost of about the equivalent of US \$0.158 per person protected.

In the pre operational survey in June 1952 the infant parasite rate was found to be 9.34% among the 814 infants examined. In November 1952 the infant parasite rate was 0.35% in the sprayed area whereas in the check area it was 5.62%. Of 288 infants only one born in May before the spraying was found positive for malar. In December 1953 the infant parasite rate in the demonstration area was nil (307 infants examined) as compared with 4% in the unsprayed area.

From that time on the infant parasite rate in the demonstration area remained negative.

In areas sprayed during 1953 for the first time 867 infant smears were all negative four or five months after spraying. As in Thailand *A. minimus* practically disappeared from the sprayed areas while it showed a very high density in the check area.

It had been found that *A. minimus* was highly selective in its resting places indoors. About 60% of all specimens caught during the day were in bedrooms, most of those caught indoors were captured under beds.

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FIG 13 MAL-
ARIA CONTROL
IN TAIWAN—I



Reading of blood
samples in the
Taiwan malaria
control project

FIG 15 16 MALARIA CONTROL TEAM IN INDIA



*The e two photographs show the means of travel
of WHO malaria-control personnel working in India*

tables or shelves. In stables, *A. muhns* was rare, while *A. hircanus sinensis* was very abundant. On the basis of these findings selective spraying was tried in 1952. Owing to the promising results of this experiment a second demonstration area was sprayed selectively in 1953. Under this scheme, all of the walls and ceilings of the rooms where people slept were sprayed as were storerooms, the undersides of furniture in sitting rooms and kitchens, and for general sanitation purposes food cabinets and toilets. Other spaces, stables, etc. were left unsprayed.

It can be seen from the following cumulative data from the Chi Shan district that the results of the selective spraying were as good as those of the complete spraying. From the entomological standpoint as well, the selective spraying gave the same results.

	Ju & Sept 1952 (pre spraying)	Oct 1952 Oct 1953	Nov 1953 Aug 1954
		First spraying	Second spraying
1 Complete spraying			
Number examined	833	2487	1725
Infant parasite rate (%)	9.6	0.4	0.0
2 Selective spraying			
Number examined	400	1836	1236
Infant parasite rate (%)	9.5	0.44	0.0
3 Check area			
Number examined	491	1997	1529
Infant parasite rate (%)	7.94	2.55	0.13
		No spraying	First spraying

The cost per person protected in 1953 was US \$0.18 for the complete spraying and \$0.134 for the selective spraying—a saving of about 25%.

India

When the first WHO malaria teams were sent to India malaria control by modern methods was already being carried out in some parts of the subcontinent. A large

scale campaign was under way in the State of Bombay and WHO sometimes sent malaria personnel assigned to South East Asia to Bombay to observe the project.

The Government of India in 1948, requested UNICEF and WHO assistance in starting malaria control schemes in other states. The request was granted in the hope that demonstrations of the results of malaria control in rural areas of India might stimulate the various states to undertake or to expand, the control of the disease in their territories.

Four projects were set up. WHO assigning to each a team composed of a malanologist and a public health nurse with the Government assigning a counterpart malanologist, an entomologist, one or more nurses or lady health visitors, malaria inspectors, and all the subordinate personnel. The projects were in four different states: Tarai, Uttar Pradesh from April 1949 to February 1953, Jeypore Hills, Orissa, from May 1949 to May 1951, Malnad, Mysore from May 1949 to April 1951, and Malabar, Madras, from December 1949 to December 1951. All were located in areas of highly endemic malaria transmitted by *A. fluviatilis*, either alone or in conjunction with *A. culicifacies*. Transmission lasted several months if not the whole year. In some of the project areas malaria was such an obstacle to development that no immigration was possible.

The results were generally very satisfactory. In some of the demonstration areas it was found that one spraying a year was not sufficient, chiefly because the local population replastered the houses thereby covering the DDT film on the walls during the malaria season. The people accepted the spraying operations willingly and their extension to neighbouring villages was often demanded.

The number of persons protected in the four projects was as follows: the horizontal

difficulty in finding "opposite numbers" for the WHO team members but with USA bilateral assistance it furnished all equipment and supplies.

A first survey took place from October 1951 to January 1952. It showed that whereas malaria was highly endemic on the coast even hyperendemic in some villages the endemicity decreased farther away from the coast line. It was therefore decided to limit the project areas to a coastal band not wider than 15-20 km. The zone near Tjilatjap was to be the demonstration area, the zone on the eastern border of the demonstration area was to serve as the comparison area, and on the eastern border of the comparison area there was to be an "experimental" zone which was to be sprayed in order to find out whether the control of this area would also control malaria in the hinterland where endemicity was very mild even before control measures were undertaken.

Two anopheline species were found to be vectors: *A. sundaeus* and *A. subpictus* of which the former was the more important. Great numbers of dissections were made. *A. sundaeus* was found positive every month of the year while *A. subpictus* was found with gland infection in February, May and June. Transmission apparently occurs throughout the year, being highest after the start of the rainy season from November to January (the dry season is from May to October).

The first spraying operations were carried out from 18 April to 17 June 1952 and protected 56,884 inhabitants. The spraying was restricted to the walls of houses up to a height of 2.5 m; kitchens and outdoor shelters were excluded. The houses in the rural areas generally had bamboo walls. In operations in October-November 1952 the whole walls of the houses including those of kitchens and other structures but excluding the roofs were sprayed. Finally in 1953 the roofs were also sprayed leaving no internal surface unsprayed so that the

average sprayed surface per person was as much as 73 m². In all 110,294 persons were protected.

The post-epidemic general malaria survey was carried out between May and July 1953. The results were as follows:

	Spl e	Paras i	1 font parasit rate (%)
1 Demonstration area sprayed April-June 1952			
Pre-operative survey (Oct. 1951-June 1952)	37.8	4.3	1.7
Post-epidemic survey (May-July 1953)	18.9	1.4	0.8
2 Check area not yet sprayed			
Pre-operative survey (Oct. 1951-Jan. 1952)	33.9	13.8	13.3
Post-epidemic survey (May-July 1953)	20	1.2	1.2
3 Experimental area sprayed Nov. 1952			
Pre-operative survey (Oct. 1951-Jan. 1952)	41.9	16.1	23.6
Post-epidemic survey (May-July 1953)	19.3	3.6	0

These results appeared rather satisfactory and confirmed the findings of the monthly infant parasite rates which had been regularly taken since September 1952. They were generally lower in sprayed areas than in unsprayed areas but showed that transmission was still continuing. Monthly morbidity surveys also indicated that fever cases were less numerous and parasitaemia less frequent in sprayed areas than in the comparison area, but still falciparum fever cases did occur also in the sprayed area.

Entomological results were rather misleading at first: anophelines *A. sundaeus* in particular were very rare in sprayed houses and more numerous in the unsprayed ones. During the last quarter of 1953, however, systematic hourly night captures showed that in the houses where no *sundaeus* could be found in the day time it was quite easy to catch them at night, chiefly when biting human beings and in a much smaller pro-

lines marking the end of WHO assistance in the form of personnel

Year	Tarai	Jeypore Hills	Malnad	Malabar
1949	14 631	60 901	48 810	
1950	139 783	117 668	118 947	52 502
1951	149 954	113 000	*	115 553
1952	185 103	114 966	*	109 857
1953	151 618	*	*	125 870

No data available

The respective state governments have continued the projects and expanded them through integration into a national malaria control programme. Dr Lakshmanan, Director General of the Health Services of the Government of India, said, at the Seventh World Health Assembly that the malaria work started by WHO in India had had so marked an effect that a national malaria campaign which aimed to protect 90 million people in 1954 had been inaugurated.

This national malaria control programme actually began in 1953. Its target is to protect 125 million people in 1955-56 out of an estimated 200 million living in malarious areas. In 1952-53, the population protected had reached 30 million; by the end of March 1954, 63 million had been protected. UNICEF has contributed and FOA is contributing large amounts of supplies for the programme.

It is estimated that the equivalent of US \$30 701 386 will be spent for malaria control in the period 1953-56 about two thirds of the funds being supplied by the central government with USA bilateral aid and the remaining third by the states concerned. The various states have agreed to provide for a maintenance programme after the completion of the three year plan. It was found during the 1953 campaign that the cost per person protected was equivalent to about US \$0.10—the same amount as was required for the WHO/UNICEF project in the Jeypore Hills in 1950-51.

It is too early to assess the effects on public health vital statistics and socio-economic

conditions that malaria control is gradually bringing about in India. However the Tarai project, in which virtual control of malaria was achieved by the time the international team was withdrawn, may serve as an illustration of some of the results of malaria control. The infant parasite rate dropped from 41.2% and 57.8% in two areas to 1.5% and 2.35% respectively, after the introduction of control measures which afforded direct protection to 185 000 people. The Tarai was a classic example of a very fertile region which could not be developed because of malaria, the transmission of which lasted throughout the year.³ A few autochthonous inhabitants could escape the effects of the disease through immunity acquired in childhood but immigrants were exposed to great danger. After the introduction of control measures in the area, colonization gained momentum, and 11 658 persons settled there. Food production was stepped up from 1 550 849 maunds in 1947-48 to 2 094 336 maunds in 1951. New industrial enterprises increased from 11 to 29 and these included new factories and a hydro-electric power plant. Several co-operative farms with modern equipment, new roads and a great increase in trade with neighbouring cities were established. In brief, an unproductive, malaria-ridden valley was restored to intensive food production and to refugee settlement on a large scale.

Indonesia

As in India, the WHO expert team sent to Indonesia found there a number of localities already protected by a residual insecticide spraying programme.

The area selected for a WHO demonstration was in the southern part of Java east of the port town of Tjilatjap. The Organization provided expert personnel for the project; the Government had great

See J. A. P. C. R. S. S. N. & Ramakrishna (1953) Bull. Wld. Hlth. Org. 9: 311.

1954 The cost of the operations per person protected was US \$0 329 and \$0 244 in 1953 and 1954 respectively

Whereas in 1953 only DDT at the theoretical dosage of 2 g per m² had been employed in 1954 several methods were followed with DDT and with dieldrin in an effort to find the most effective and most economical type of spraying for an eventual nation wide campaign of malaria control which would be the natural follow up of the international assistance given by WHO and UNICEF

It is envisaged that all the 3 million people of Iraq who are now exposed to malaria will be under protection in 1956

Lebanon

Lebanon has a total population of 1·3 million of which 135 000 reside in zones considered malarious From surveys made in 1951-53 chiefly by WHO experts malaria was found to be endemic in the coastal plains along the river courses and in the northern portion of the Bekaa the large valley separating the Lebanon mountains from the Anti Lebanon range The vector is *A. sacharovi* alone or in conjunction with *A. superpictus* Epidemic malaria on the other hand is characteristic of higher regions where *A. superpictus* is probably the main vector

A WHO malaria-control demonstration was carried out in Lebanon from July 1951 to the end of January 1954 The international personnel of the project consisted of a malariologist, an entomologist a sanitarian and a public health nurse who was replaced after eight months by a national colleague The Government, in February 1952, attached to the project a medical officer the aforementioned public health nurse and subordinate personnel In March 1953 a sanitary engineer joined the national team Equipment, supplies and transport for the project other than those provided by the Government, were furnished by WHO through Technical

Assistance funds Later in 1953 when the malaria-control programme was expanded into a nation wide scheme UNICEF supplied part of the insecticides required

FIG 17 MALARIA CONTROL IN LEBANON



Spraying the interior of a house with residual-action insecticide

The original demonstration area was divided between the Akkar and the Cazas of Hermil and Baalbek and the check areas were established mostly across the Syrian border in Syrian territory—a good example of inter-country co-operation in malaria control Following the first year of activity of the project the Government planned a nation wide programme for 1953 with WHO personnel collaborating in the planning in

portion, when resting on the walls. Unfortunately trapping attempts failed, so that it is not known what happens to the *sundacus* which do rest at night on the walls. But there seems to be an indication that *A. sundacus* in that area has perhaps changed its behaviour after exposure to DDT. At the time it was confirmed that transmission was continuing during the last quarter, four new infections were found in infants in the sprayed area, and, during the next quarter, five new infections were discovered.

It is still too soon to be able to explain the relative failure of DDT in the Tjilatjap area, but the problem is being investigated. In the meantime, a new demonstration area has been selected in the Regency of Kedu, stretching about 70 km east of the eastern limits of the previous area. An initial survey was carried out in February-March 1954 and gave a crude spleen rate of 87.4%.

Iraq

In August 1950, at the request of the Government of Iraq a public health engineer trained in malariaology was sent by WHO to assist in the supervision of emergency control operations against an impending malaria outbreak following floods. Later in 1951, the Government requested aid in malaria control. An agreement was signed in February 1952 and a malaria control demonstration was initiated.

WHO personnel arrived in Sulaimaniya headquarters of the project in July 1952. Surveying was immediately started and lasted eight months. It was found that the two vector species were those common in the eastern Mediterranean region—*A. sacharovi*, and *A. superpictus*. The latter hibernates completely, but the former, in spite of the cold winters of Kurdistan, seems to hibernate only partially. The Tanjero valley which was roughly the area of the demonstration was shown to be mesoendemic with several

localities particularly south of Sulaimaniya, being decidedly hyperendemic.

Supplies, equipment and transport were provided by WHO from Technical Assistance funds, for the 1952 activities. In 1953 a large amount of material was furnished by UNICEF, so that it was possible to spray other nahias adjacent to the demonstration area as well as the demonstration area itself. Spraying operations started in April 1953 and continued until the end of August.

Since transmission in most districts begins not later than June the protection of the area sprayed later in the summer could have been only partial. Thus in the three districts that had been sprayed between April and June spleen rates dropped from 50% 60% to 15%–20%, whereas in the two districts where spraying was carried out in August, there was no appreciable reduction. Infant parasite rates in October–November were 6% in sprayed areas (285 infants examined) as compared with 13% (146 examined) in the check area. The density of the two vector species in the area sprayed in the spring was practically zero but they continued to be present in great numbers in the unsprayed areas.

Owing to various circumstances the total population protected by spraying operations in 1953 amounted to only 23 000. A great expansion of the operations was planned for 1954. A new malariologist was assigned by WHO and the national entomologist continued to assure entomological investigations. A closer relationship was established with the Institute of Endemic Diseases in Baghdad which assigned a doctor to assist the WHO malariologist in the pre-operational survey which started in 27 February and terminated before the end of June.

Spraying operations started in late March 1954 and were completed by mid July, the houses of 209 000 people were sprayed. The average superficial area sprayed per person protected was 83 m² in 1953 and 74 m² in

of the development of some degree of resistance on the part of *A. sacharovi* to DDT in two villages in 1953⁶

Of the countries that extend from the shores of the Mediterranean eastwards to Iran Lebanon has been the first to carry out, with international assistance nation wide malaria control. The campaign was continued in 1954 and it is hoped that it will be repeated in future years so that full eradication may be achieved. The training undertaken by WHO through fellowships granted for the purpose and through the direct action of the WHO team has also prepared the ground for the establishment of an adequate malaria service.

Pakistan

One of the earliest of the WHO malaria control demonstrations was that in Pakistan. Operations started on 17 May 1949 and terminated on 31 January 1951. WHO provided three members for an international team: a malariologist, a public health engineer and a public health nurse. The Government provided a senior entomologist, a second entomologist, two medical officers and a sanitary engineer. UNICEF furnished equipment, transport, and supplies other than those which were the responsibility of the Government, which, as is usual in WHO projects, also paid for auxiliary personnel and other labour.

The headquarters of the project were in Gouripur, Mymensingh district, East Bengal. Surveys were made in June and December 1949 and in June-July and November-December 1950 both in the demonstration and in a comparison area. This project, like many others in the course of the investigations, modified pre-existing views on the epidemiology of malaria in the area. It was believed that transmission was limited to the second half of the year but the team was

able to establish that there is a pre monsoon transmission probably more significant than the post monsoon transmission. (The S.W. monsoon starts about 10 June and lasts until September.) In other words it might be concluded that, in the area in question, transmission lasts from the end of April to November.⁷

Of about sixteen species of anophelines present—some of which were very prevalent (*A. annularis*, *A. aconitus*, *A. barbirostris*, *A. philippinensis*, *A. hyrcanus* and *A. vagus*)—only *A. philippinensis* was found infected although about 2468 dissections were made of the other species also. *A. philippinensis* was the only species captured in greater numbers in bedrooms than in cowsheds. It was discovered that it breeds usually in dead rivers or marshes with submerged vegetation at about 1.2 m from the edges. There are two periods of high density breeding: April-July and October-mid November. The species was found infected in May which proves the pre monsoon transmission. This finding, however, was made in 1950 which explains why operations in that year did not start when they would have if this knowledge had been available previously.

In 1949 the first spraying operations started only in July owing to delay in arrival of supplies; they lasted until September. The spraying was at the rate of 2 g of DDT per m. More than 34 000 people were protected. In 1950 the operations started on 17 April and lasted until 25 August obviously too late now that the pre monsoon transmission was proved to exist. In this year 231 916 persons were protected. The spraying was at the rate of 2 g per m² except in a few zones where 1.5 or 1.0 g were used. The villages already sprayed in 1949 were resprayed with either 1.0 g or even 0.5 g per m². This reduced dosage was motivated by the discovery that DDT (suspension) remained bio-

Garrett Jones, C. & Gramiccia, G. (1954) *Bull. Wild Dis. Org.* 3: 165.

See Ours, M. S., Ahmad, Mebahudin & Gramiccia, G. (1951) *Bull. Wild Dis. Org.* 3: 613.

the surveys, and in the operations and supervising the assessment of results and the training of personnel

There are probably at least three vector species in Lebanon *A. sacharovi* which was the only species found infected by the team, *A. superpictus*, and *A. claviger*. Apparently *A. sergenti*, *A. hyrcanus*, *A. algeriensis*, and *A. marteri*, though present, do not play a noticeable role, if any, in transmission.⁴ The demonstration and check areas were surveyed five times in the course of the project and practically the whole country was surveyed in preparation for the nation wide programme.

Spraying operations in 1951, limited to the demonstration area, covered the houses of about 33 000 people, the following year the population protected was practically the total population at risk—135 000 of which 102 784 were in the project area.

In April-June 1953, the control operations were carried out in different sectors by the Ministry of Health, the WHO team, the Karaheusian Foundation, and UNRWAPRNE.

The epidemiological study undertaken by the WHO team prompted the adoption of different measures of control: spraying all internal wall and ceiling surfaces with DDT at 2 g per m² either once or twice a year (the latter in the Akkar plains where the presence of indoor fires in the particular type of house would soon cover the DDT deposited with soot), or spraying with a particular method, studied already the previous year and consisting of alternating on the inside walls horizontal sprayed bands with similar bands left unsprayed, larval control of wells in the few sectors where *A. claviger* was present and was on epidemiological evidence the only vector, or larval control and residual spraying in areas where both *superpictus* and *claviger* were present. The technical efficiency of the spraying operations was remarkable: the superficial area treated per man hour

(per sprayman) was 311.8 m², and the provisional estimate of the cost per person protected gave the equivalent of US \$0.17.

The system of band spraying,⁵ on which a preliminary report was presented to the Fifth International Congress on Tropical Medicine and Malaria, was studied by the team. The results did not differ from those of areas where the whole of the inner surfaces had been sprayed. Still an entirely satisfactory comparison of one method with the other could not be made for the same reasons which interfered with the final evaluation of the results of the various control measures adopted. These reasons were several: first, malaria endemicity was declining in Lebanon and in neighbouring territories during the period; secondly, the year 1952 was a year of particularly low transmission; thirdly, movements of population; and fourthly, previous use of DDT spraying in a number of villages of the demonstration area in Lebanon, and the domestic use of insecticides which altered the normal conditions of transmission in the check areas in the Syrian territory.

There is no doubt, in spite of the lack of reliable comparison areas (where malarious rates dropped as well), that transmission was remarkably reduced during these two years as illustrated below.

Surveys	Demonstration area (Akkar) Hermil Baalbek		Comparison area (unsprayed)	
	Splen- rate	Parasite rate	Splen- rate	Parasite- rate
	(/)	(/)	(/)	(/)
First (pre operational)	26.3	2.8	57.4	7.1
Second	13.7	0.17	33.8	2.2
Third	10.0	0.7	20.7	1.1
Fourth	8.4	0.18	17.8	1.05
Fifth (final)	4.5	0	18.9	0.78

Among the many valuable observations that the team made on the epidemiology and entomology of malaria in Lebanon was one

⁴ See Gramiccia, O. (1953) *Rev. méd. Moyen-Orient* 3: 293.

⁵ Gramiccia, O., Garrett Jones, C. & El Din Sultan, O. (1953) *Riv. Parasit.* 34: 123.

the WHO assisted project, assumed the responsibility for malaria control in sectors other than the demonstration area

The demonstration area was the Sarapee district and the comparison area for the first spraying operations was the adjoining Sansai district—both in Chiang Mai Province northern Thailand. These areas were chosen on account of their high malaria endemicity, their density of population and their agricultural importance. Irrigation made possible the production of two crops of rice a year but malaria caused high morbidity during periods when labour was particularly needed for agricultural tasks. There was a general impression among the inhabitants that malaria had always been a serious problem in the foothills and that it spread to the plains with the introduction of canal irrigation.

The vector of the Chiang Mai Province had not previously been determined but early in the project *A. minimus* was incriminated and was soon found with infected glands. During the 28 months of operation of the project a total of 23 439 anophelins were dissected of which 17 119 were *A. minimus*. This species only was found infected with sporozoite rates varying between 1.5% and 3.1%.

It was important to discover where *A. minimus* preferred to rest in houses. Resting places of more than 16 000 specimens were studied and it was found that 92.7% had been captured indoors, most of them (about 86.7%) below a height of 2 m from the floor. Only 1.05% of all the *minimus* studied were captured under the "tattoo" that is the platform on which the raised wooden houses which are characteristic of the area are built. On the basis of these studies spraying covered all wall surfaces except those directly exposed to the outside, all the furniture parts etc. which formed semi-permanent features indoors: mosquito nets, mats and hanging objects in the rooms. When barns were used for human dwellings

they were also sprayed as were cattle sheds and bath enclosures when provided with walls. Experimentally it was found that the tattoos need not be sprayed and they were omitted in the 1951 operations.

The first cycle of operations began in the spring of 1950 and had dramatic results. The second spraying cycle took place the following year when the responsibility for the operational direction had already been transferred to the Thai medical officers with WHO personnel serving only in an advisory capacity. All the data concerning the operations can be found in table I page 70. The

FIG 18 MALARIA CONTROL IN THAILAND



End of the spraying operations, writing the date of the spraying

logically active on the walls (bamboo some times plastered with mud) of the rural houses of the area for even more than one year

The results were good, but they would probably have been better if spraying operations had terminated each year before mid April, as was recommended in the final report on the project. In malariometric terms, the results are expressed as follows

	Date of survey	Number of children examined	Parasite rate (%)	Spleen rate (%)
1 Area sprayed in 1949 and in 1950	June 1949	450	25	
		1559		69.5
	Nov Dec 1950	1062	4.4	
		1050		7.8
2 Unsprayed check area	June July 1950	903	22.7	
		835		68
	Nov Dec 1950	770	14.6	
		769		66.9

No conclusions could be reached concerning the infant parasite rates because the number of infants examined was too low. From 26.1% of 23 infants examined before spraying, the cumulative infant parasite rates after spraying dropped to 5% of 223 examined in the sprayed area but the infant parasite rate was still 24% of the 217 examined in the unsprayed area.

From the entomological point of view, the results were satisfactory not only did adults of the vector species practically disappear from the houses sprayed only a year before but also the larval density was remarkably reduced in comparison with that of the unsprayed area, contrary to what was happening in the non vector species, as shown below

Larval density—average results per 100 dips
August December 1950

	<i>A. philippine</i> s/s	Non vector species
Sprayed area	0.025	52.7
Unsprayed area	12.5	55

The annual cost per person for the spraying amounted to the equivalent of about US \$0.165

Besides malaria control and related work in environmental sanitation and in maternal and child health the WHO team undertook, at the request of the Government, a survey and control scheme of kala azar.

Already in 1950 the East Pakistan Government, utilizing a surplus of the 1949 UNICEF allocation for malaria control, had extended the control work in the districts covered by the WHO project, thus protecting 84,351 persons. These control measures were carried out mostly by personnel trained by the WHO team. In 1951, the Government, with UNICEF aid, protected about a million persons, after termination of the WHO/UNICEF project. Progressive increase in the number of people to be protected was planned and for the most part, has been achieved in East Pakistan alone, more than 1.7 million people were protected in 1953 with the total for the whole of the country reaching 5.5 million. A country wide programme of malaria control is still going forward, with considerable assistance from UNICEF.

Thailand

The population of Thailand is about 18.3 million of which about 6 million live in malarious areas. A WHO malaria control demonstration was carried out in Thailand between August 1949 and December 1951.

A WHO team consisting of a malariaologist, an entomologist, a sanitarian, a public health nurse and three laboratory technicians was sent to the country. UNICEF supplied equipment, transport, and insecticides. The Government attached to the project a malariaologist, a malariaologist entomologist, an engineer (for one year) and laboratory personnel, sanitary inspectors, nurses and all other essential workers. Further, the Government set up two national teams which concurrently with the WHO demonstration and after having worked for some time on

The political conditions of Viet Nam did not offer many opportunities to carry out systematically the survey operational training and evaluation work that characterizes most WHO malaria control demonstrations. However French malariologists had thoroughly studied the disease in many regions of Viet Nam and so the first member of the WHO team to arrive a sanitary engineer was immediately entrusted by the Government with some spraying operations. This was in December 1950 the team malariologist arrived in April 1951.

WHO personnel undertook the technical supervision of malaria squads established in various regions of the country such as the provinces of Gôcong Bien Hoa Thu Dau Mot, Tayninh and the four provinces of the Pays montagnards du Sud—Banmethuot, Pleiku Kontum, and Djiring Dalat. Supplies equipment and transport were furnished by the Government, with bilateral assistance from the USA.

The activities of the team suffered because of a dearth of senior personnel for many months after the sanitary engineer had been transferred to another assignment, the WHO malariologist had no professional collaborator. Further the Government was unable to provide a national malariologist until August 1952. No entomologist, either national or international served on the project.

It can easily be realized how difficult it was to survey and to control a sector where military escort was necessary. Still malariometric surveys were made of the province of Gôcong which has severe seasonal malaria transmitted by *A. sundanicus* and probably also by *A. subpictus* and of the high plateaux of the Pays montagnards du Sud where the WHO malariologist acted as technical adviser.

Spraying operations were carried out in many villages in the latter region where the vector is *A. minimus* and to a lesser ex-

tent *A. jeyporiensis*. Although transmission appeared to be reduced this reduction was less than would have been expected. The lack of an entomologist the ever present insecurity of the country some inferior supplies of DDT and finally the impossibility of keeping unsprayed comparison areas represented additional difficulties in carrying out and assessing the value of the operations. It was only in November 1952 when a WHO sanitarian arrived that the malariologist could organize some observations by detaching him to the Pays montagnards du Sud area. No anophelines adult or larvae were captured in sprayed villages though *A. minimus* was present in the unsprayed ones. Unfortunately observations could not be continued so no conclusions could be reached.

Malaria-control work was effected mainly in the province of Gôcong where spraying with DDT (at the theoretical rate of 2 g per m²) was carried out once a year in October before the transmission season. The population directly protected by the last spraying amounted to about 60 000. The spleen rate which was 33.5% in July 1951 was 7.7% in December 1952 and the parasiticide rate had dropped during the same period from 19.1% to 5.1% among 2500 children examined all from villages of the province.

No evaluation could be made of the spraying operations in the provinces of Tayninh, Bien Hoa, and Thu Dau Mot. With regard to the Pays montagnards du Sud⁴ four years' experience showed that, although DDT spraying had an indisputable efficacy its action was manifested rather slowly in rural areas where malaria was hyperendemic. For this reason it was thought useful to attack the parasites by means of chemotherapy as well as attacking the anopheline population by means of DDT. The method adopted in these experiments was the use of drugs for a short period of time once every fortnight.

⁴ See Farmand, M.-E. & Choumra, R. (1954) *Bull. Wld Hlth Org.* 11: 793.

results may be indicated, however, by the drop in the monthly infant parasite rate. Of 3922 infants examined before the spraying, from September 1949 to March 1950, there were 29.04% positive, after the first spraying, of 1694 infants examined in the same period (i.e., September 1950 to March 1951), only 2.59% were found infected. The infant parasite rate among all the infants born after the spraying during a period of one year, totalling 2135 was only 0.47%, whereas in the comparison area the corresponding rate was 24%. After the second yearly spraying, which took place in April 1951, blood slides of 1598 infants were examined between May and November, and their aggregate parasite rate was nil.

In November 1949, when the team started its work, the survey spleen rate was 63.8% and the parasite rate 47.3%, after the 1950 and 1951 sprayings, the rates, in November 1951, were 12.8% and 0.8%, respectively.

These dramatic results in malarionometric indices were accompanied by more surprising entomological findings—i.e., a nearly total elimination of the vector species, as can be seen from the following data.

	<i>Anopheles capri</i> red	<i>A. minimus</i> captured	Man hours employed
Demonstration area			
Serapee district			
Before spraying			
Aug 1949-Apr 1950	87320	9167	6911
After spraying			
May 1950-Feb 1951	1864	—	6315
May 1951-Nov 1951	4695	1*	3579
Comparison area I			
Sansai district			
Before spraying			
Aug 1949-May 1950	22057	5296	2855
May 1950-Feb 1951	32524	5888	3688
After spraying			
May 1951-Nov 1951	4992	1*	2454
Comparison area II			
N Maerim			
Unsprayed			
May 1951-Nov 1951	9104	1507	1278

* These specimens were young, unfed ones captured near the periphery of the sprayed area. They were presumably hatched out from larvae drifted into the area. Both specimens were dead before arrival in the laboratory.

The monthly density of *A. minimus* larvae per 100 dips in the demonstration area was nil from May 1950 to March 1951, after the first spraying. After the second, it became positive (0.04) in July, but was nil in all other months. The Sansai area also became negative after its first spraying (0.5 in May, nil from June to November 1951) whereas in the comparison area II, which was left unsprayed, the density per 100 dips was May, 25; June, 5; July, 10.5; no data for August, September, 0.7; October, 1.33; and November, 4.

In 1951 Thailand began to receive substantial bilateral assistance from the USA, and the country was able to envisage a nation-wide malaria control programme. A five-year plan was drawn up for the period 1953-57. Already in 1952, after the termination of the co-operative tripartite project, 1,541,288 people were protected, in 1953, 3 million were protected. In the latter year Dr. Luang Ayurakul Kosol, Director of the Division of Malaria and Filariasis Control of Thailand, stated in his presidential address to the First Asian Malaria Conference: "WHO and UNICEF sowed the seeds, STEM [USA bilateral assistance] watered and fertilized those seeds, and thus malaria control [began] to bloom in Thailand."

The programme now being carried out by the Government, with bilateral assistance from the USA, provides for the protection of 4.5 million persons in 1954, and within the following four years, all of the 6 million people in the malarious area, of the country should be under protection. After three years of spraying, each major area will be put under surveillance, and it is planned that in 1958 a programme of protective surveillance and incidental control operations will be instituted. At that time, the programme might be carried on without external assistance. It is estimated that the surveillance programme will cost the equivalent of about US \$0.05 per person annually.

for two months. Drugs were distributed only to children in the age group 0-15 years and to pregnant women. Mepacrine was first used and was later replaced by chloroquine. Other drugs, pyrimethamine and amodiaquine, were also used. This method utilizing both treatment and prevention gave interesting results and deserves consideration together with DDT spraying for the control of malaria in hyperendemic rural areas.

The project terminated in July 1953. After the departure of the WHO personnel, the Government planned to continue malaria control activities entrusting to specialized male nurses the surveys and the spraying operations under the supervision of technicians supplied through USA bilateral assistance.

PILOT PROJECTS

Observations of the bionomics of some anopheline vector species have suggested that residual insecticide house spraying methods might not control the transmission of malaria

earned by them. This would be the case for example if the species fed and rested only outdoors or even if it fed indoors but never rested upon the house walls. Determination of the habits of anophelines is difficult however for several reasons. Entomological observations are generally made during the day but it is known that many species of mosquitos go indoors at night and leave at dawn or before. On the other hand, observations made at night are more difficult and less reliable since the artificial light necessary for the work may alter the reactions of the mosquitos. Under these circumstances the only way to make sure whether or not residual spraying would be effective against particular vector species is to try it.

It is for making experimental studies of the efficacy of spraying and other malaria control techniques that pilot project teams are sometimes sent to particular countries. Pilot projects are also undertaken to determine the most effective and least expensive control methods under certain conditions.

FIG 19 ENTOMOLOGICAL
OBSERVATIONS



*Searching for adult mos-
quitos indoors (India)*

TABLE 1 SELECTED OPERATIONAL DATA ON SOME WHO ASSISTED MALARIA CONTROL PROJECTS 1949-53

Country	Average superficial area treated per person protected (m ²)				Average superficial area treated per man hour per spray man (m ²)				Cost of DOT as per cent of total cost (%)				Cost per person protected per year (US \$)			
	1st year	2nd year	3rd year	4th year	1st year	2nd year	3rd year	1949	1950	1951	1952	1953	1st year	2nd year	3rd year	4th year
India																
Tamil	60.9	50.8	39		119	174	230		5.0	5.5	40.0		0.22	0.19	0.16	
Jeyapore Hills	15.3	19.7			139	215		45.5	6.0				0.10	0.10		
Malnad	30.6	31.6			~5	~66							0.12	0.12		
Malabar	~9.5	31.9			155	204			31.6	27.5			0.17	0.16		
Pakistan	40.6	46.0			200	204		45.1	57.0				0.16	0.17		
Afghanistan	48.5	67.3	68	44	207	255	151	53.5	61.0	75.0			0.23	0.23	0.20	0.12
Thailand	31.6	22.0			145	160			53.3	64.5			0.13	0.10	0.35	
Iran	100.0	93.0	95	123								67.0				
Viet Nam	14.1	13.8			~91											
Lebanon	37.0	39.7			209	312					51.8		0.16	0.17		
Cambodia	33.2	33.5			153	153			6.6		26.6		0.43			
Indonesia	32.7	73.0			175	305					66.0	84.1	0.12-0.19	0.25		
Burma	31.6	31.5			248	352					39.0	58.8	0.23	0.24		
Philippines	35.0	35.0			311	140					46.0	43.9	0.27	0.22	0.19	
Saudi Arabia													0.75			
China (Taiwan)	47.2	40.7			276	215					63.5		0.16	0.17		
Iraq	63.0	74.0			240	234							0.33	0.34		
Syria	74.0				177								0.31-0.35	0.35		
Estimated																



Mixing a dieldrin suspension in preparation for spraying

After a second pre operational survey which lasted from December 1953 to April 1954 and which showed an overall spleen rate of 19% a parasite rate of 22% and an infant parasite rate of 16% the first round of spraying operations started actually beginning at the end of February 1954 and ending in May

Liberia

In 1951 the Liberian Government requested assistance from UNICEF for malaria control. With WHO technical advice a pilot project was planned aimed at determining the most efficient and most economical method of malaria control in the forest area of Liberia so that malaria control could eventually be expanded in the most rational way.

Since aid in yaws control had also been requested it was found expedient to merge the two so that the same laboratory building the same general installations and even the practice of house-to-house visiting could serve both projects. For the malaria control WHO supplied a team composed of a mala-

riologist an entomologist and a sanitarian. Their assignment started in March 1953 and the headquarters of the combined project was established at Kpain a few miles from the frontier town of Ganta. The Government had in the meantime built houses and a laboratory. UNICEF furnished equipment and supplies.

The area was typical of the equatorial African forest. The population density was about 165 per square mile along the roads, but only 27.7 in the bush. The first general survey (April-July 1953) showed a spleen rate of about 90% (median 91.6%) and a parasite rate varying according to locality from 72% to 91% (median 82.5%). It was a holoendemic situation in which both *A. gambiae* and *A. funestus* were found with infected glands.

More than 14,000 persons were protected by the first spraying operations in May and June 1953. Three insecticides—DDT, BHC and dieldrin—were applied to different sectors in different dosages and following different schemes. For instance DDT was sprayed on walls and roofs in one sector and only on the inside of the roofs in another

From the organizational standpoint, pilot project teams are very much like those used for demonstration projects. Their equipment is slightly more elaborate, however, to allow for further ecological observations.

Brief descriptions of some of the WHO malaria control pilot projects follow.

Cameroons

When UNICEF's assistance was requested by the French Government for malaria control in the Cameroons, in Togo and in French West Africa it was realized that it would be advisable to undertake some operational research to determine the best and most economical insecticide to control malaria transmitted by *A. gambiae*—in addition to other species—in various zones of French West Africa and French Equatorial Africa. Accordingly, the Government undertook to carry out two pilot projects in Senegal and in the Upper Volta entirely with French personnel but WHO aid was requested in the form of the services of a senior malarologist and a sanitarian for a pilot project in the Cameroons, the Government to supply another malarologist, an entomologist and other necessary personnel.

The project was planned so that the pilot zone would lie within a much larger area which would also be protected by residual spraying in the hope that the risk that persons from the experimental zone might be infected during night visits outside its borders might thereby be minimized. The headquarters was situated in Yaounde. The town itself is protected by the Municipality, so that the project area can be described as an annular band about 35 km in radius around the territory of the capital in a forest zone inhabited by about 40 000 persons.

The project started in April 1953 and the first survey was undertaken with many difficulties between 9 April and 24 August during a dry period of the year. At that time

A. gambiae was found only infrequently, but contrary to earlier reports it could be captured in houses during the day time though apparently only in areas of high endemicity. It was discovered, with some surprise, that instead of there being a widespread hyper or holo endemicity, the endemicity of malaria varied greatly from place to place: spleen rates in children ranging from 20% to 60%. The epidemiology of the infection appeared to be rather complex, some of the variability of transmission being due to differences in tribes and their living conditions. When the main rainy season started in September 1953 the correlation between indoor captures of *A. gambiae* and high spleen rates was no longer observed. *A. gambiae* breeding increased greatly, and adults could be found in considerable numbers indoors.

In the meantime, the malaria entomological laboratory in Yaounde began its work, and a few months later other new laboratories and office facilities were inaugurated, thereby greatly facilitating the observations.

Of the many species of anophelines present, sporozoites were found in the salivary glands of five *A. gambiae*, *A. funestus*, *A. nili*, *A. moucheti* and once *A. welcomei*. A new species *A. (Neomyzozia) rageai* was found and described in all its stages by the French entomologist assigned to the project.

In order to study the main problem of the pilot project five different treatments were planned, as follows:

- 1 BHC—0.2 g of the gamma isomer per m² two or three times a year
- 2 Dieldrin—0.5 g per m² once a year
- 3 DDT technical —2 g per m² walls and roofs once or twice a year according to needs,
- 4 DDT—2.2 g p.p. isomer per m², walls only, once or twice a year,
- 5 DDT—2 g per m² walls only once or twice a year according to needs

compared with rates above 20 % in unsprayed areas. There are indications that infants found positive in the sprayed areas were living in houses left unsprayed. Further data

summarized below confirmed the initial results.

In 1954 a field trial with dieldrin (250 and 500 mg per m²) was carried out, in Northern

TABLE II. RESULTS OF MALARIA CONTROL PILOT PROJECT IN MINDORO, PHILIPPINES

A. Infant parasite rates

Date of survey	Demonstration area		Comparison area	
	number examined	positive rate (%)	number examined	positive rate (%)
Pre-operative survey April-May 1953	417	3.1	157	33.3

First spraying

Unsprayed

Infants born after 14 July 1953

December 1953	89	0	61	3.7
March 1954	192	1	162	24
June 1954	352	0	290	21.4

Second spraying

First spraying

Infants born after spraying

September 1954	359	0.6	60	0
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B. Children 2-9 years

Date of survey	Demonstration area				Comparison area			
	number examined	fever rate (%)	number examined	parasite rate (%)	number examined	fever rate (%)	number examined	parasite rate (%)
Pre-operative survey April-May 1953	934	74.5	897	2.4	842	5	806	34.2

First spraying

Unsprayed

March-April 1954	902	28.3	625	5.3	874	57.4	840	27.4
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Second spraying

First spraying

March 1954	971	17.3	926	4.5	1017	71.1	1051	3.1
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The first post operational survey, which was carried out between November 1953 and January 1954, gave indications that the spraying had reduced transmission. At about the same time, a pre operational survey of an 'expansion' area was undertaken, and the high endemicity of the country was confirmed. A spleen rate of 84.2% was found in the 2-4 year age group. The expansion area was then treated, bringing the number of inhabitants protected to 56 000.

Philippines

There were serious doubts as to whether or not malaria transmitted by *A. minimus flavirostris*, the vector most common in the Philippines, could be controlled by means of residual insecticides. WHO agreed, in 1952, to sponsor a pilot project to determine if residual spraying might prove an effective and economical means of malaria control. Accordingly a team consisting of a malarialogist and an entomologist, to whom the Government assigned as opposite numbers a malarialogist and a medical entomologist, carried out a pilot project between February 1952 and June 1954. The Organization also contributed a small amount of supplies through Technical Assistance funds, the rest being provided by the Government, with bilateral assistance. During the second year of operations, the WHO personnel acted only in an advisory capacity.

Headquarters of the project were in Pinalan, eastern Mindoro. The demonstration area in 1952 was situated south of this town, and the check area north of it. Pre operational surveys showed high spleen and parasite rates in both areas: the former being 77% and 52.4% in the demonstration and in the check area respectively, and the latter 43.4% and 34.2%, infant parasite rates were 32.1% and 33.3%.

A. minimus flavirostris was the only vector in most of the area and its bionomics were

thoroughly studied. During the second year a recently opened area in the foothill regions of the interior of the island, Menan, was surveyed. In this area, *A. mangyanus*, a species closely related to *A. minimus flavirostris*, was prevalent and was also an efficient carrier of malaria. Gland infected specimens of *flavirostris* were found chiefly during the latter part of the year in Mindoro, but one gland infection was registered also in February. From the beginning of the entomological investigations, it was ascertained that this species rested indoors in the daytime in appreciable densities and was therefore not such a wild species as not to be amenable to control by DDT residual spraying. Further it was found that most of the specimens indoors did not go higher than about 2.5 m from the floor. *A. mangyanus* was also found indoors during the daytime but at lower heights mostly below 1 m.

These findings gave hope that residual spraying might be effective even in Mindoro. Three sprayings were carried out, all with DDT at a theoretical dose of 2 g per m² once a year, using a 75% water dispersible powder.

The first spraying covered the demonstration area, lasting from 11 May to 14 June 1952 and protecting 25 177 people. The second spraying, directed by the national malarialogist, lasted from 23 March to June 1953 and covered all the island including the comparison area of 1952 with a total population of 143 079. The third spraying in March-April 1954, protected 107 086 people; many families refused this cycle, for several reasons. The cost per person protected of the operations in 1954 amounted to the equivalent of about US \$0.19.

The pilot project showed that malaria transmitted by *A. minimus flavirostris* in Mindoro could be controlled by one yearly application of DDT at the rate of 2 g per m². Among infants born after the second spraying the parasite rate was less than 1% as

sions" of Sarawak and gave a general impression of the prevalence of malaria in the country. The demonstration area chosen was in the territory of the river Baram and its tributaries; the comparison area was in the basin of the river Tinjar. On the upper reaches of the Baram spleen rates as high as 88% and parasite rates of 50% were found. The distance of the demonstration and check areas from Kuching led the senior adviser to move his headquarters to Marudi in the Baram district.

A. leucosphyrus and *A. barbirostris* were the only species found with infected glands. *A. letifer* was also found with sporozoites but as the area in which they were found infected was not really malarious it was suspected that the infection was not human. The Malaria Reference Laboratory in England later confirmed that the sporozoites were of non human malaria.

The first spraying operations were carried out in February-March 1953 partly with DDT (Upper Baram) and partly with BHC (Lower Baram). DDT spraying was to be repeated every six months, BHC every three months. The theoretical dose of DDT was 2 g per m² that of BHC, 0.10 of gamma isomer. The second DDT and the third BHC sprayings were carried out in August-September 1953. In April 1954 the third DDT and the fifth BHC sprayings were started. In all 31 villages with a total of about 6500 inhabitants were sprayed in the demonstration area.

This project is the only one in which motor vehicles have not been used; all movements have been made by canoes with outboard motors or on foot. In addition, because of the distances and the difficulties of communications it has been found more convenient to parachute supplies and insecticides rather than to transport them by surface.

Preliminary data from this project would seem to indicate that malaria carried by

A. leucosphyrus and *A. barbirostris* in Sarawak can be controlled by residual insecticides.

MALARIA-CONTROL ADVISORY TEAMS

Advisory teams are sent to a country upon the request of the government to assist in planning a malaria-control scheme, in raising the technical level of the operations and of their assessment, in training personnel and in establishing an organization for malaria control to take care of future developments. A large part of the assistance that such a team may give to a government is in surveying the whole country and in defining its malaria epidemiology. Often a malaria control demonstration team after one or two years' activity acquires the status of an advisory team.

A malaria-control project in Iran may serve as an example of the work of an advisory team.

Iran

In 1950 by agreement with the Government of Iran WHO assigned a team composed of a malariologist, an entomologist and a public health engineer to advise and guide the relevant bodies of the Government on (1) the establishment of a permanent antimalaria organization, (2) the development of a national malaria-control programme and its practical application and (3) the establishment of a national training programme for technical and auxiliary personnel.

The international personnel started their work in Iran in April 1950 and remained there until June 1953. Co-operating with Iranian malariologists and entomologists they assisted in clarifying the epidemiology of malaria in the country and in determining the distribution of anopheline species. During the period of the work of the team in Iran the Government progressively expanded its



FIG 21 PILOT PROJECT
IN THE PHILIPPINES

*Taking blood samples of
children for determining para-
site rates*

Luzon according to the pattern of the Mindoro pilot project by the Government Malaria Control Division with personnel trained in the Mindoro project. By 4 July 1954, a total population of 30 577 had been protected in this experiment.

According to reports from the Philippines the success of the WHO pilot demonstration led to the settlement of areas in Mindoro which had previously been considered dangerous on account of malaria. Malaria control on this island will be continued along the lines proved effective in the Mindoro project as part of a nation wide programme in which the Government, with bilateral assistance from the USA, aims to protect all the population of the malarious areas of the country by the end of 1958.

Sarawak

As in the Philippines a pilot project was undertaken in Sarawak to determine whether residual spraying could control malaria transmitted by a not too well known group of vector species—the *A. leucosphyrus* group. WHO supplied a malariologist and an entomologist for this project, though the latter was part of the team on a full time basis only. Some time after the initiation of the work, the Government assigned a senior health inspector and auxiliary personnel to the project. In this instance WHO also provided equipment and supplies through Technical Assistance funds.

A first survey was made during the second half of 1952. It covered all the five 'divi

INTERNATIONAL EXCHANGE OF TECHNICAL INFORMATION

The exchange of technical information serves all countries and is one of the major functions of WHO. It is accomplished by several means: expert committees, symposia and conferences, consultant and fellowships, and other professional training activities and documentation.

In malaria control the Organization aims to promote extensive use of the new methods and to put information on the latest developments at the disposal of health administrations and health workers concerned with this problem. As an international health agency in touch with malariologists and with malaria field activities in all parts of the world, WHO can make available the authoritative advice of malaria experts from different countries and can act as an international clearing house for information which might not be easily accessible through other channels.

EXPERT COMMITTEES AND ADVISORY PANELS

To give technical authority to its advice to governments and to aid in formulating its own programmes, WHO calls upon experts from all countries. The Director General appoints an expert advisory panel on a particular subject, such as malaria, paying attention to the geographical representation as well as to the technical competence of the individuals chosen.

From the relevant advisory panel are selected the members of expert committees which are convened to discuss specific aspects of certain health problems. The choice of members of an expert committee depends upon the topics to be considered. This system of drawing the committee from a larger

technical group, the expert advisory panel, makes possible a flexibility of membership and is a further guarantee of the technical competence and of the international character of the committee. The reports of the expert committees are a guide for health administrations and provide the technical basis for WHO's activities with regard to the subject in question.

The Expert Committee on Malaria was the first WHO technical committee to meet in Geneva, its initial session being held in April 1947. It formed a link with the Malaria Commission of the former League of Nations, but it had at its disposal weapons which the Commission did not possess—residual insecticides and new drugs.

In its first report,¹⁰ the committee spoke of country-wide malaria-control programmes by DDT house spraying, thus advocating the practicability of control on a scale which would have been inconceivable a few years earlier. While singling out as the method of choice for malaria control the destruction of the mosquito vector in its adult stage indoors, by means of spraying with residual action insecticide, the committee nevertheless recognized that tactics had to be adapted to the conditions of each locality.

The Malaria Commission of the League of Nations had knowledge of two antimalarials in addition to quinine—pamaquine (then called plasmoquine) and mepacrine (then known as Atebrin). But the Expert Committee on Malaria, from its early meetings, has had for consideration a number of drugs which have been developed since League of Nations days—proguanil, chloroquine, amodiaquine and pentaquine and isopentaquine, to which two other important antimalarials

residual spraying campaign. A malaria control organization developed, and an institute of malariology was eventually established by the Ministry of Health and the University of Teheran. This institute was responsible for the general epidemiological and entomological survey of the country, for the planning of the control campaign, for the assessment of the results, and for training programmes, whereas the active implementation of the campaign was en-

trusted to a co-operative public health organization (a joint enterprise of the Government and USA bilateral assistance), largely decentralized at the provincial level.

The national campaign is large in scope. In 1953, for example, 14 542 villages were sprayed, affording protection to a population of 4 243 938. Although it is still in progress, the work has already reduced morbidity from malaria with consequent improvements in social and economic conditions.

WHO OBJECTIVES IN MALARIA CONTROL

- 1 To promote the eradication of malaria as a public health problem from the world,
- 2 To assist governments in establishing or strengthening their malaria services and in developing their national programmes of malaria control in the light of available scientific knowledge
- 3 To stimulate and co-ordinate research in the fields of malariology and malaria control
- 4 To promote and facilitate the exchange of technical information

standard spraying-equipment on a regional basis and to deal with all other questions relating to the proper use of insecticides" ¹²

This committee has drawn up specifications intended to guide both consumers and manufacturers of insecticides and spraying equipment. In 1953 these specifications were published under the title *Insecticides manual of specifications for insecticides and for spraying and dusting apparatus*. The committee is continuing to make additions and amendments to the specifications contained in this manual which because of its loose leaf form can be kept up to date.

CONFERENCES AND SYMPOSIA

Conferences and symposia are another means of bringing together experts on a particular subject for an exchange of views and for pooling knowledge and experience. WHO-sponsored conferences are often of regional interest designed to obtain corporate and authoritative advice on problems of a regional nature.

One such problem with regard to malaria, and an extremely important problem is the control of malaria in Africa south of the Sahara transmitted by *A. gambiae*. Until recently almost nothing had been done about malaria in tropical rural Africa, where the disease is practically ubiquitous. There were several reasons for this seeming inertia the principal ones being differences of opinion as to the advisability of controlling malaria in a population which in adulthood did not appear to suffer greatly from the infection owing to immunity obtained in childhood and the conflicting results of the first trials of residual insecticides in the control of malaria carried by *A. gambiae*.

To aid in the clarification of these two problems WHO in collaboration with the Commission for Technical Co-operation in Africa South of the Sahara, organized the Malaria Conference in Equatorial Africa, held in

Kampala Uganda in 1950. This conference gave partisans of different viewpoints an opportunity to meet and discuss what should be done about malaria in Equatorial Africa. They reached the unanimous opinion that "whatever the original degree of endemicity malaria should be controlled by modern methods as soon as feasible and without awaiting the outcome of further experiments" ¹³. With regard to methods of control the conference participants indicated the insecticidal techniques which they believed could be expected to reduce transmission of malaria even in *A. gambiae* areas. The conference in effect stimulated the initiation of malaria control in rural Africa and provided technical guidance as to the best procedures to be followed.

A question of general interest in malaria control is how to achieve a satisfactory co-ordination in time and space of large scale programmes within a country and between adjoining countries with the aim of eliminating malaria from vast areas and thereby enabling the interested countries eventually to discontinue residual insecticide campaigns. This was the main subject discussed at the First Asian Malaria Conference held under the auspices of WHO in Bangkok Thailand in September 1953 ¹⁴. One of the particularly significant recommendations made at this conference was that "in planning malaria control programmes the principle of merging the areas of control both within and outside the borders of the countries concerned on an inter-country intra regional and inter-regional plane be followed".

A third conference on malaria, the Second Asian Malaria Conference actually concerned two Regions the Western Pacific and South East Asia. This conference which met from 15 to 24 November 1954 in Baguio the Philippines emphasized the necessity of planning malaria control so that the disease

pyrimethamine and primaquine, have been added in the past five years

In spite of the enormous value that the committee recognizes in some of the new drugs, its repeated opinion has been that, except during epidemics, in routine malaria control they do not play a primary role. Collective chemo prophylaxis can be recommended only in particular circumstances, such as for aggregations of labour living under conditions in which an effective attack on transmission is not feasible or has not yet been undertaken for mobile groups in malarious territories, for certain easily supervised social groups, such as schoolchildren, living in endemic areas where control measures are not yet in operation, and for armies in the field.

In its fifth report,¹¹ the committee expressed certain views concerning the use of anti-malarial drugs: first that some of them (proguanil and pyrimethamine) should be limited to suppressive use and not be employed for treatment at least of acute malaria in non-immunes, secondly, that synthesized anti-malarials may play an important part not only during malaria epidemics, but also in malaria control campaigns in areas where the application of antimosquito measures is impossible or likely to be unsatisfactory because of the behaviour of the local vector, movements of the population or other factors; finally, that radical cure of malaria cases which is now generally possible should be considered an essential measure for limiting the extension of the disease when the vector control campaign has been interrupted and new cases arise, owing to relapses or immigration of infected individuals.

The place of antilarval measures has also been specified by the committee. In general, such measures are too costly to be justified where spraying with residual insecticide to kill the adult vectors can effectively control malaria. There are however certain circumstances in which antilarval measures are pre-

ferable or necessary for example in concentrations of population and urban zones where larval control is usually more economical, in rural areas where the local vector breeds in only a few and easily identifiable and accessible places (this is true for example, of *Anopheles maculipennis* in Dalmatia, *A. claviger* in Lebanon, and *A. pseudopunctipennis* in Mexico), making the treatment of these places less expensive than spraying all the houses and, finally, in places where residual spraying does not give the results one might expect, as in localities where people sleep outdoors during the transmission season and where the local vectors generally bite men and rest outdoors.

When larval control is indicated it is not advisable to use the same insecticide or a nearly related one as is used for residual spraying in view of the danger of vectors' developing resistance to the latter.¹²

In summary, the committee concluded at its last session that

despite the great success of the newer forms of insecticidal work there still remains room for the use of the more traditional methods such as antimalarial drugs, prevention of breeding and especially of the creation of man-made breeding grounds and the fostering of changes in the practice of agriculture and animal husbandry and in social conditions which have by themselves eliminated malaria from large territories in Europe and America.¹³

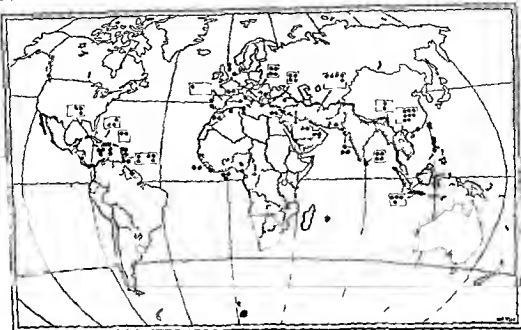
When residual insecticides were first declared the weapon of choice for malaria control, very little was known about them. Producers and purchasers of insecticides and of equipment for applying them needed technical guidance. It was to help meet this need that WHO on the suggestion of the Expert Committee on Malaria in 1948 convened an Expert Committee on Insecticides among whose principal tasks was "to specify international standards for insecticides and their formulation to stimulate the development of

¹¹ See Ch on *Wld Hlth Org* 1954 8 131

¹² *Wld Hlth Org techn Rep Ser* 1954 80 4

¹³ *Wld Hlth Org techn Rep Ser* 1954 80

FIG 22 WHO ASSISTANCE IN MALARIA CONTROL, 1947-53 FELLOWSHIPS CONSULTANT AID TEAMS



- Fellowships for study of malaria control and entomology
- ▭ Countries visited by WHO malaria experts
- ▣ Countries which received the technical assistance of WHO teams in carrying out anti-malaria work

given to professional personnel from countries which in general do not have facilities for specialized training in malaria control. Four such courses have been held: one in Rome in 1949 in collaboration with the Istituto di Malariologia E. Marchiafava and the Istituto Superiore di Sanità; two in Portugal in Lisbon and Aguas de Moura in 1951 and again in 1952; and a fourth in Lagos, Nigeria, in 1952. A fifth course is now in progress in Yaounde, the Cameroons. All except the course in Lagos were given in French.

With the co-operation of a malaria institute or the malaria services of a country, a course of two to three months' intensive training in malaria control is arranged. WHO invites authorities of international standing to give lectures in addition to those given by the regular staff of the institute or malaria

organization and by other specialists from the host country and grants fellowships so that government-selected Fellows from a number of countries may attend. The enrolment averages twelve persons—doctors, entomologists, and sometimes other professional personnel concerned with malaria control. To date, 38 fellows have received training in WHO-sponsored courses.

All aspects of malariology are dealt with as fully as the allotted time permits, and practical work is combined with lectures and demonstrations. At the course in Lagos, for example, lectures accounted for 96 hours, practical work 91 hours, and demonstrations, film shows, discussions, and seminars 45 hours. At the conclusion of the course, an examination is given, and those who successfully pass it are awarded a certificate.

could be eradicated and the residual insecticide house spraying discontinued in as short a time as possible before the vector may develop resistance to the insecticide used. The participants reviewed the situation with regard to the prevalence of malaria in the two Regions and to efforts under way to control it, and pointed out that effective control was feasible for comparatively little financial investment.

A symposium of great interest to workers in malaria was sponsored by the WHO Regional Office for Europe and the Istituto Superiore di Sanità—the First International Symposium on Control of Insect Vectors of Disease, held in Rome in October 1953.¹⁷ At this symposium it was generally agreed that the principal method of controlling insect vectors of disease is the use of insecticides, and that the most difficult problem is the development of resistance to insecticides.

It was emphasized that detailed study of insect physiology and biochemistry and free research are required, and that there is no time to spare. The symposium participants suggested the different lines of research which should be immediately pursued and the type of international action and co-operation which would be most useful.

CONSULTANT AID

A direct form of exchange of technical information is the advice given to health administrations upon request by experts from other countries. WHO aid of this type in malaria control is illustrated in fig. 22.

In some instances the experts in question are WHO headquarters or regional office staff members, in others they are consultants recruited for assignments of varying lengths for specific purposes. A consultant may go to a country to aid in planning a malaria control scheme (Professor A. Missiroli, to

Bulgaria and Hungary, 1949), to lecture in universities or other institutes on modern methods of malaria control (Professor J. M. Henderson to India and Thailand 1949, Dr A. Gabaldon, to India, Dr M. F. Boyd, to Venezuela, and Professor M. E. Shortt, to the USA, all in 1950, Professor P. C. C. Garnham, to Portugal 1951 and 1952 and Professor G. Raffaele, to Portugal 1952), Sir Gordon Covell, Dr P. F. Russell, and Mr M. H. Holstein to Nigeria 1952), to give advice on special questions such as whether, for a given territory, vector species eradication might be preferable to a simple malaria control programme (Dr D. Bruce Wilson, to Ceylon, 1950) or to make a general survey of malaria prevalence and malaria control in a continent (Professor F. J. C. Cambournac, Africa, 1950) or in particular countries (Dr G. Giglioli to Mexico 1949, and to Nigeria and the Gold Coast, 1952).

TRAINING OF PERSONNEL

A dearth of professional personnel is one of the principal difficulties facing many countries which want to undertake malaria control. Since training facilities and the funds necessary for training activities are in many instances also lacking, governments request international assistance in building up a corps of trained workers for malaria control organizations and operations.

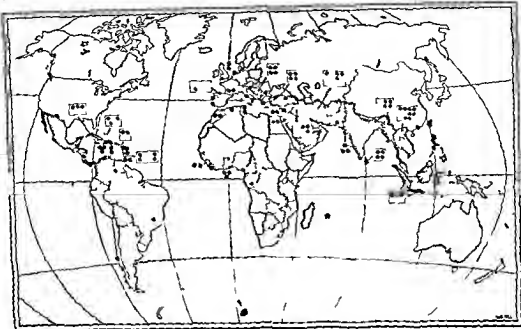
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Courses in malariology

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¹⁷ See *Chron. Wild Dis.* 1954, 8, 1-9. The papers presented at this symposium have been published and are available through the *Fondazione Emanuele Paternò*, Viale Regina Elena, 299, Rome. The papers are in either French or English, with summaries in these two languages and in German and Italian.

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CO-ORDINATION OF RESEARCH

Two problems of paramount importance for malaria control which WHO is emphasizing as subjects of investigation are (1) the development of resistance to insecticides in vector species and (2) the interaction between certain absorbent wall surfaces and insecticides.

As has been indicated (page 43) and as will be discussed further in another section

(page 90) at least two vector species are known to have become resistant in some places to DDT, and in the case of *A. sacharovi* in Greece resistance to other chlorinated hydrocarbon insecticides has also developed. It therefore seems advisable wherever malaria control is carried out by the application of insecticides to make observations on the possible decrease in susceptibility of the local anopheline vector species to the insecticides being used. Such observations

FIG. 23 FIELD TESTING OF ANOPHELINE SUSCEPTIBILITY TO INSECTICIDES



Standard field testing kit for determining the susceptibility of the local anopheline vector species to the insecticides being used. Anopheles are put in contact with filter paper impregnated with standardized DDT solution in oil. Thirty-four of these outfits are in use in different parts of the world, aiding in the study of the behavior of anopheline populations in relation to their possible resistance to insecticides, the mechanism of which is not yet being investigated by specialized laboratories.

Fellowships

The granting of fellowships is one of the most widely used types of assistance which WHO gives governments in strengthening their health services. It is a valuable means of exchanging technical information, since the fellow can pass on to others the knowledge which he has gained abroad or in special, internationally sponsored courses offered in his country.

In addition to awarding fellowships to participants in WHO sponsored courses in malariology, the Organization grants fellowships to government selected professional personnel to attend the regular training courses held in malaria institutes in many countries—e.g., India, Italy, Pakistan, Portugal, and Venezuela.

In all, up to the end of 1953, 157 fellowships were utilized by medical graduates, entomologists or engineers from 58 countries, for studies in malaria control (see fig. 22).

In service training

In service training given in conjunction with field operations in malaria control, is a practical approach to the problem of preparing personnel for malaria-control services. Such training is given by all WHO field teams. National "opposite numbers" of international team members are prepared to take over the work and to train other national personnel.

Unlike regular training courses and fellowships, in service training is not restricted to professional personnel but also reaches sanitary inspectors, field assistants and foremen, laboratory assistants, and insect collectors. It aims to form in the country a nucleus of people adequately trained at all levels, for a malaria control organization.

Data from a survey of the training activities carried out in the various WHO projects up to the end of 1953 are summarized below.

NATIONAL PERSONNEL TRAINED IN WHO MALARIA CONTROL PROJECTS 1949-53*

Medical officers who received training as national counterparts to WHO team members in malariology	30
Scientists who received training as national counterparts to WHO team members in entomology	10
Public health engineers/sanitararians who received training as counterparts to WHO team members in malaria control	11
Medical officers who received training as trainees in malariology	216
Scientists who received training as trainees in entomology	16
Public health engineers/sanitararians who received training as trainees in malaria control	19
National project personnel who received training in field work	265
National project personnel who received training in laboratory work	179
National trainees who received training in field work	544
National trainees who received training in laboratory work	87
TOTAL	1 377

* Including in service training

can be made in the field and with more precision in specialized laboratories

For field observations WHO has developed a testing outfit (fig 23) which is distributed to entomologists working with WHO teams and to many other entomologists in national malaria-control services. This outfit based on the method suggested by Busvine & Nash¹⁸ is used for determining LD₅₀ on mosquitos kept for a given time in a container lined with filter paper impregnated with a given oil solution of DDT or other insecticide

For more precise determination of the susceptibility of vector species to insecticides WHO has enlisted the co-operation of the London School of Hygiene and Tropical Medicine and the Istituto Superiore di Sanità, Rome. Eggs of vector species are sent to either of these institutes where attempts are made to obtain and maintain a colony of adults which may subsequently be utilized for testing susceptibility to given insecticides by the Busvine & Nash technique or by other methods. Thus far it has proved difficult to transport the eggs rapidly enough to obtain sufficient adults to start a colony

The second problem the interaction between walls and insecticides sprayed on them, is important in many malarious areas of the world. Bordas Downs & Navarro¹⁹ found that in Mexico the activity of DDT on adobe walls varied considerably while on certain types of adobe the DDT remained effective

for more than three years on other types it lost its efficacy within three months. More recently other investigators²⁰ (A. B. Hadaway & F. Barlow—personal communication 1954) have found that this inactivation of DDT on certain types of mud is due to its adsorption to its penetration into the depth of the mud walls. A correlation has been suggested between the iron oxide content of the mud and the speed of such adsorption.

Accurate study of building materials of this sort is needed to determine which insecticides should be used for malaria control in certain areas. To this end WHO has initiated a co-ordinated testing programme of earth used for building houses or huts. With the assistance of some of the members of the Expert Advisory Panels on Malaria and on Insecticides a technique for the uniform performance of tests has been proposed (see fig 24) and several institutes have agreed to carry them out. Collaborating in this research are the Institut Pasteur Paris, the Istituto Superiore di Sanità Rome, Geigy Laboratories Basle, Malaria Institute of India Delhi, División de Malariología Maracay, Communicable Disease Center Savannah and the Serviço Nacional de Malária, Rio de Janeiro. Samples from most of the WHO-assisted projects have been sent to one or another of these laboratories and investigations are under way.

It is hoped that on the basis of very recent observations made by F. Barlow (personal

See Wild Hth Org. An. Rep. Ser. 1954 80 30.
Bordas, E., Downs, W. G. & Navarro, L. (1951) *Science* 114
39. d. B. d. d. E., Downs, W. G. & Navarro, L. (1953) *Bull.*
Wild Hth Org. 9 39

¹⁸ Hadaway, A. B. & Barlow, F. (1951) *Nature (Lond.)* 167
854. Barlow, F. & Hadaway, A. B., *Bull. Nat. Re.* 1951 41 603
1951 41 769 43 91 211 1953 44 45

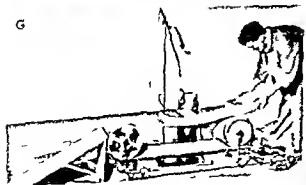
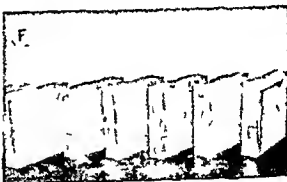
Explanation of fig. 24

- A — Unbaked mud bricks sent by one of the WHO teams for testing at the Istituto Superiore di Sanità
- B — Breaking up the mud specimens
- C — Making a paste of fragments with distilled water
- D — Filling specially made forms with the mud paste
- E — Smoothing the surfaces of the newly made bricks
- F — Mud bricks ready for spraying to be used as the back wall of testing cages

G — Spraying of the prepared mud bricks. The speed of the conveyor belt and the delivery rate of the nozzle are calculated to give a precise amount of insecticide per unit of surface.

H — Biological testing of mosquitos in shallow cages in which they are confined between a glass wall and the sprayed back wall. At the right is a CO₂ tank the CO₂ being used for stunning the mosquitos before transferring them to the observation cages.

FIG 24 TESTING ACTION OF INSECTICIDE ON SAMPLES OF EARTH USED AS BUILDING MATERIAL



(All photographs published by courtesy of the
Istituto Superiore di Sanità Rome)

*Malaria terminology*²⁴ the work of a drafting committee appointed by WHO is a guide for malaria workers in that it describes what amount to standardized procedures in epidemiological inquiries on malaria. The terms cover the malaria parasites and the infections to which they give rise, the measurement of malaria in the human community and the malaria vector. The standardization which this work furthers is of great importance in making possible the assessment of results of malaria-control campaigns and the comparison of results in different countries. A French equivalent of this monograph *Terminologie du paludisme*²⁵ has also been published.

The latest monograph on malaria (in press) is *Chemotherapy of malaria*²⁶ an up-to-date review of current knowledge of antimalarials and their place in malaria control. It considers the rationale of malaria chemotherapy from both the chemical and the biological approach, discusses each of the commonly used compounds in detail and the resistance

to them which is sometimes manifested and describes the clinical use of antimalarial drugs.

The *Chronicle of the World Health Organization* in addition to giving an account of the Organization's activities and summarizing its more technical publications contains on occasion, full reports on conferences or on meetings of consultant or study groups. Two meetings of interest to malaria workers were thus reported in the *Chronicle* last year: the First Asian Malaria Conference and the First International Symposium on the Control of Insect Vectors of Disease.

Papers which are considered of less lasting value than those included in WHO publications are often given limited distribution in the form of mimeographed documents. Such documents are intended mostly for members of expert groups or for internal use by the Organization or institutes with which it works.

A list of publications on malaria may be found on page 97.

TOWARDS WORLD-WIDE ELIMINATION OF MALARIA

THE COSTS OF MALARIA CONTROL

The price of malaria control by residual insecticides is but a fraction of what uncontrolled malaria costs a community in terms of the social and economic consequences of the disease. But although malaria control represents a profit rather than an economic loss for the country as a whole, this profit

is not noted in the record of expenses for the control programme. The expenses are borne largely by the central government or by local budgets, whereas the profits go for the most part into family budgets. Governments might justifiably recoup their expenses by an increase in taxation or by charging the communities concerned—and through them the families of the community—for malaria control which has been undertaken as is done for example in Spain. Regardless of the means by which they are financed, however, malaria-control measures would be more readily applied if they were less expensive than they are today.

Covell, G. Russell, P. F. & S. W. Greaves. N. S. (1953) *Malaria terminology: part I of a monograph* prepared by the World Health Organization Geneva (World Health Organization Monograph Series No. 13).

Vaucolet, M., Roubicek, E. & Galliard, H. (1954) *Terminologie du paludisme: rapport d'un comité de rédaction nommé par l'Organisation Mondiale de la Santé* Geneva (World Health Organization Monograph Series No. 2).

Covell, G. Russell, G. R. Field, J. W. & Singh, I. (1955) *Chemotherapy of malaria*, Geneva (World Health Organization Monograph Series No. 7).

communication 1954) and by M. A. Alessandrini (personal communication, 1954), "impression preparations of the surface of walls may be achieved on adhesive material which could subsequently be analysed in a reference laboratory for its content of insecticide. This procedure would eliminate the necessity for carrying out complicated chemical, physical, and biological tests on bulky material such as portions of walls or bricks prepared from earth shipped from remote areas."

While these two problems are the chief subjects of WHO investigations relative to malaria control, others of considerable practical significance are part of the operational research carried out by field teams engaged in malaria control. Such research—on epidemiology, entomology, and techniques of control and their evaluation—is made possible by the varied composition of the teams and by the uniform pattern of their observations, as has been suggested in the section describing WHO assisted malaria control demonstrations.

TECHNICAL DOCUMENTATION

Publications and documents are one of the principal channels for exchange of technical information and are a form of assistance which reaches all countries. WHO publications are concerned particularly with subjects related to the Organization's work and considered of international health significance.

In the *Bulletin of the World Health Organization*, which is the main scientific periodical of WHO, are published the results of specific disease control methods, studies of the geographical distribution of diseases, surveys on specific subjects made by expert consultants on behalf of WHO, original findings made in the course of WHO field programmes, laboratory studies on subjects

of interest to the Organization, and reviews of the literature on subjects relevant to the work of WHO. A recent number of the *Bulletin* is devoted solely to malaria control.¹

In the *Technical Report Series* appear the reports of expert committees and other expert groups and the reports on some of the conferences held under WHO auspices. Three reports of the Expert Committee on Malaria and four of the Expert Committee on Insecticides and the report on the Malaria Conference in Equatorial Africa have been published in the *Technical Report Series*.

The *World Health Organization Monograph Series* contains studies of wide interest and lasting value, each monograph being on one particular subject and, in most cases, representing the views of one author. Some, however, are a collection of papers on a certain topic by a number of contributors. There are several monographs on malaria.

*Lutte antipaludique par les insecticides à action résistante*² was the first report on large scale campaigns against malaria through the use of residual insecticides. It is a carefully documented study of campaigns in about twenty countries in four continents.

A second monograph, *Biology of Anopheles gambiae*,³ is the result of research carried out in French West Africa on the principal vector of malaria in Africa. It is an important and highly specialized study of a vector which was responsible for severe epidemic malaria in Brazil, where it was eventually eradicated. Annexes give details of the geographical distribution of *A. gambiae* in Africa, a table of sporozoite rates for certain regions, and a key to the identification of the common anopheles in French West Africa.

¹ Bull. World Health Org. 1954, 11, No. 4-5.

² Pampana, E. J. (1951) *Lutte antipaludique par les insecticides à action résistante*. Genève: World Health Organization Monograph Series No. 3.

³ Malstein, M. H. (1954) *Biology of Anopheles gambiae*. Research in French West Africa. Geneva: World Health Organization Monograph Series No. 9.

A. sacharovi in Greece² *A. albimanus* in Panama,³ and later *A. superpictus* and *A. maculipennis* in Greece⁴

The problem of resistance in *A. quadrumaculatus* in the USA is still being discussed. Evidence has accumulated to show however that *A. sacharovi* has developed a physiological resistance to DDT and that, in the case of *A. albimanus* the resistance is of a behavioural type. In some localities in Java, *A. sundanicus* has apparently also developed resistance to DDT; this resistance seems to be physiological in areas where antilarval measures were formerly applied and behavioural in others where they were not under taken (W. J. Stoker—personal communication 1954).

Many other species have been claimed to have developed DDT resistance but few if any of the reports have been sufficiently substantiated. Some confusion has resulted from a lack of definition of exactly what is meant by resistance to insecticides. At the First International Symposium on the Control of Insect Vectors of Disease (see page 82) the following definition was given: "Resistance to insecticides is the development of an ability in a strain of an insect to tolerate doses of toxicants which would prove harmful to the majority of individuals of a normal population of the same species. The term behavioural resistance describes the ability to avoid a dose which would prove harmful."

From this definition it is clear that the term "resistance" alone could be employed only for physiological resistance. It may be inferred that while behavioural resistance need not necessarily interfere with the control of transmission, physiological resistance will as soon as it has reached a certain level.

Physiological resistance of anophelines in Greece in 1952 did not seem to prevent continued control but, when the data for the 1953 malaria-control campaign in Greece were obtained it was recognized (G. Belios & G. A. Livadas—personal communication 1954) that a high proportion of the malaria cases which had occurred in that year had taken place in villages which had been preventively sprayed with DDT. It then appeared that in these villages DDT had failed to prevent transmission. Similarly in 1954 a small epidemic of malaria caused by *A. sundanicus* in DDT sprayed Tandjung Priok and Tjirehon Java (W. J. Stoker—personal communication 1954) was another example of how DDT resistance may cause failure in efforts to control malaria.

It has been noted that in the USA (*A. quadrumaculatus*) in Greece (*A. sacharovi*, *A. superpictus* and *A. maculipennis*) and in the above-mentioned localities in Java (*A. sundanicus*) where resistance may have or has developed, larvicidal measures have also been applied. This is the reason for the recommendation at the Rome symposium on insect vectors of disease that "the use of chemically related insecticides against both the adults and the larvae of the same species should not be carried out simultaneously in the same area." It should be mentioned, however, that WHO team members working in Lebanon observed DDT resistance in *A. sacharovi* in two villages in which no deliberate larvicidal measures with chlorinated hydrocarbon insecticides had ever been recorded.⁵ It would be difficult to exclude the possibility that contact of the insecticide with the larval population of the vector species had occurred however since farmers may have used the insecticide.

It is quite possible that switching over to other chlorinated hydrocarbon insecticides may be successful when signs of resistance

Livadas, G. A. (1951) Do anopheline species resist DDT? (U. P. blabbed working document WHO Mal/74)

Trop. d. H. (1953) *Ann. J. Trop. Med.* 1: 433

Tr. p. d. H. (1954) *Bull. Wild. Hlth. Org.* 11: 225

Li. das, G. A. (1954) *Ri. Malar.* 33: 23

Belios, G. (1954) *Ri. Malar.* 33: 31

Garrett Jones, C. & Gramaccia, G. (1954) *Bull. Wild. Hlth. Org.* 11: 265

WHO has always given considerable attention to the problem of the costs of malaria control. Among the tasks of demonstration teams is that of experimenting with systems of selective spraying and trying to determine whether or not a single spraying might suffice to control malaria.

It has been found that in some countries a single annual spraying with 2 g of DDT per m² can effectively control malaria, yet, in nearby countries where the vectors are the same and climatic conditions similar, two sprayings per year have been adopted. It appears that the periodicity of the spraying operations, as well as selective spraying needs further exploration, and that an experimental sector should be set aside in every large malaria control programme for experimenting with different cycles and patterns of spraying. Is it necessary, for example, to spray all the buildings even those that do not shelter any man or animal? Is it essential everywhere that all inner surfaces of houses be sprayed? Questions such as these are being answered in many countries by experiments undertaken by WHO team members, as has been noted in the descriptions of malaria control campaigns—for instance with regard to the taitoons in Thailand (page 67) spraying only up to a height of 2 m in Burma (page 53) and a particular type of selective spraying in Taiwan (page 58) in all three of which the vector was *A. minimus*.

If malaria control in Africa south of the Sahara were carried out according to the recommendations of the Kampala conference (see page 81), it is likely that in many areas it would be doomed because the costs would be too great. In all the pilot projects assisted by WHO in Africa, various insecticides, dosages and patterns of selective spraying are being experimented upon in the hope of finding methods more economical than those recommended at the conference.

As has been previously indicated costs of spraying operations are carefully noted

and analysed in all WHO aided malaria control projects. Table I (page 70) shows the costs per person per year of the projects in Asia. It will be seen that these range from US \$0.10 to \$0.35, excluding Cambodia where, because of unusual conditions the cost was \$0.43. In south east Asia the maximum was reached in Burma (\$0.24) owing to a low population density and a relatively high wage level of personnel employed for the control work.

It is felt that the cost of malaria control should represent only a small proportion of the annual budget for public health. If the latter amounts to the equivalent of US \$0.50 per person per year and malaria control costs \$0.25, it is doubtful whether malaria control on a nation wide scale would be possible. It could become conceivable however if plans were made to eradicate malaria from the territory within a few years so that eventually the recurring item of malaria control could be struck from the annual budget. It might also be feasible if, as has been suggested, the government found a way to have its expenses reimbursed by those who profit from malaria control. Finally, there is the possibility that the per person cost of malaria control could be further reduced, making it less of a burden on the public health budget.

RESISTANCE OF ANOPHELINES TO INSECTICIDES

It was in 1947 that the development of DDT resistance in flies was first reported, although this resistance did not become a well established fact until the following year. The implications for anopheline control were quickly recognized but it was only in 1951 that the development of resistance to insecticides was observed in certain vector species *A. quadrimaculatus* in the USA,¹

¹ Ludik G. F. Snow, W. E. & Hawkins, W. B. (1951) *J. nat. Malar. Soc.*, 10: 33.

three years and if no newly infected persons migrate into the community and no member of the latter goes into areas where malaria may be contracted the community could be considered free of malaria infection in both man and mosquito. Except perhaps for infections caused by *P. malariae* generally limited to a few localities it might be assumed that the hypothetical community above would have achieved eradication of malaria.* The danger of a return of transmission would exist only in the importation of infection from outside the community.

If instead of in an isolated community malaria eradication were achieved over a very large area—for example a group of countries or a continent—the dangers of reintroduction of the infection into any of the malaria free areas would be greatly reduced. The implications are obvious: malaria-control programmes should be planned so as to arrive at eradication simultaneously in as large an area as possible. WHO has discussed this concept at its malaria conferences and has offered its assistance to governments in planning control programmes along these lines within countries and between countries.

Although the general trend in malarious countries today is to extend control measures as much as possible the ultimate objective of eliminating malaria as a public health problem from the world calls for a revision of strategy at both the national and the international level.* On the national plane the more malaria is being controlled the more difficult it will be to ensure credits for the continuation of the work. When control is so successful that only a few cases occur every year it will become increasingly difficult to guarantee the allocation of funds for main-

taining the antimalaria campaign at the same level of efficiency as was achieved when malaria was the cause of much illness and economic loss. There are two alternatives: continuing year after year the present campaigns until the government stops the credits or perhaps until the local vectors become resistant to the insecticide with serious consequences in either case if malaria has not yet been fully eliminated or concentrating efforts on eliminating malaria within a few years. The latter course is naturally to be preferred though the immediate costs would be greater. However it entails a revision of plans so that malaria control efforts may be co-ordinated, control of selected localities be replaced by area control and efficiency of operations and their supervision be intensified. At the international level co-ordination of malaria control programmes between countries is required.

This new strategy might bring about important changes in the type of assistance given by WHO. The old formula of the demonstration team might become obsolete but expert advice to governments by individuals or by pilot or advisory teams might be requested more frequently.

Intensifying malaria-control efforts would mean a need for more trained personnel and this would call for a redefinition of training programmes. In addition, training in special procedures would become essential. The determination of the end point of malaria transmission requires new techniques in which very few countries have any experience. Even the most sensitive indicator of transmission the infant parasite rate may not be reliable and may suggest that there is no more transmission when other means of investigation such as an adequate "epidemiological surveillance" as it has been termed in Greece might reveal that transmission is still continuing and needs to be stopped before spraying can be discontinued. To

*According to the criteria set forth by the National Malaria Society of the U.S.A. eradication is achieved when no primary human case has occurred in a given area for three years. (See *Wld Hlth Org J* Am. R. p. Ser. 1954 83 3-3)

See Panpapa, E. J. (1954) *Bull. Wld Hlth Org* 11 513 (résumé in *Ciran. Wld Hlth Org* 1954 8 3,3)

to DDT appear, DDT resistance does not necessarily imply a polyvalent resistance to all the insecticides of the group. Although *A. sacharovi* in Greece was stated to have become resistant to BHC and to chlordane as well as to DDT,⁸ it was still susceptible to dieldrin. But it is likely that once resistance to one of the members of the group has developed, resistance to the others is acquired more quickly, so that after a few years one may envisage the possibility that the local anopheline population might become resistant to all the chlorinated hydrocarbon insecticides. If at that time malaria has not been eliminated from the country and control must be continued, will it be practicable to employ organic phosphorus insecticides, against which in nature the development of resistance in insects does not seem to occur so easily? If not, will it be necessary to go back to the pre DDT era, with space spraying or antilarval measures, or to adopt once again that eclectic system which before the Second World War, was applied in the Pontine Marshes? If so, not much hope would be left of eradicating malaria from many countries in the near future.

Certainly chemistry may produce powerful synergists of present preparations, or new and better insecticides less toxic and more lasting than the phosphorus compounds of today. In the meantime there is encouragement in the observation that the development of resistance seems to require many years of exposure to the insecticide, which means that, by greatest efficiency in malaria control spraying operations and by covering as large an area as possible total interruption of malaria transmission might achieve elimination of malaria parasites from the area before resistance to the insecticide has time to develop.

PLANNING FOR THE FUTURE

In the first years of application of residual insecticide spraying, it was thought that this control measure would be a recurring one like the chlorination of water supplies, and that therefore expenditures for spraying would have to be maintained from year to year. In 1950 the possibility of discontinuing residual spraying was envisaged, and in 1953 the WHO Expert Committee on Malaria concluded that the practice of discontinuing residual spraying under proper safeguards after several years of achieved malaria control, is both logical and feasible, and should be given careful consideration by administrations that have carried out malaria control to a satisfactory end point in all or the major parts of their territories.⁹ Thus far this interruption of antimalaria spraying operations has taken place, on a larger or smaller scale, in a few countries: British Guiana, Ceylon, Greece, Italy, Thailand and the USA.

Interruption of residual spraying requires either that the anopheles vector species be eradicated or that no more malaria infections exist in the area. The first condition does not generally apply and is not the recommended goal of residual spraying but it has been practically achieved in British Guiana (*A. darlingi*) in some parts of Italy (*A. labbranchiae*) and of Greece (*A. sacharovi*) in some sections of Java (*A. sundanensis*) and in certain areas of Thailand (*A. minimus*). More commonly, spraying campaigns succeed in interrupting transmission although the anopheline vector species are still present resulting in a state of anophelism without malaria.

The two main malaria infections of man when they do not kill do not last long even if untreated. With few exceptions falciparum infections do not last longer than one year and vivax infections longer than two years. If no new cases occur in a community for

Livadas, O. A. & Georgopoulos, G. D. (1953) *Wld Hlth Org* 8: 497.
Georgopoulos, G. D. (1954) *Wld Hlth Org* 11: 855.

⁹ *Wld Hlth Org Tech Rep Ser* 1954: 80. 4

three years and if no newly infected persons migrate into the community and no member of the latter goes into areas where malaria may be contracted the community could be considered free of malaria infection in both man and mosquito. Except perhaps for infections caused by *P. malariae* generally limited to a few localities it might be assumed that the hypothetical community above would have achieved eradication of malaria.⁸ The danger of a return of transmission would exist only in the importation of infection from outside the community.

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taining the antimalaria campaign at the same level of efficiency as was achieved when malaria was the cause of much illness and economic loss. There are two alternatives: continuing year after year the present campaigns until the government stops the credits or perhaps until the local vectors become resistant to the insecticide with serious consequences in either case if malaria has not yet been fully eliminated or concentrating efforts on eliminating malaria within a few years. The latter course is naturally to be preferred though the immediate costs would be greater. However it entails a revision of plans so that malaria control efforts may be co-ordinated, control of selected localities be replaced by area control and efficiency of operations and their supervision be intensified. At the international level co-ordination of malaria control programmes between countries is required.

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⁸ According to the criteria set forth by the National Malaria Society of the U.S.A., eradication is achieved when no primary and genuine malaria has occurred in a given area for three years. (See *Wld Hlth Org. An. R p. Sr.* 1954 30 3.)

⁹ See Pampana, E. J. (1954) *Bull. Wld Hlth Org.* 11 513 (reprinted in *Chron. Wld Hlth Org.* 1954, 2 3 8).

train personnel in the new techniques of determining the end point of transmission governments may request WHO aid They may also seek advice from the Organization on when malaria control campaigns can safely be interrupted

There is still another consideration in planning for eradication of malaria. When elimination has actually been achieved and maintained—that is, when spraying has been discontinued and there has been no transmission of the infection for a few years—then precautions must be taken to assure that the disease does not return This maintenance, or surveillance, should begin not with interruption of spraying but at least one year before It would not require a special antimalaria service and might well be part of general rural health services if these were adequate and if the personnel had first been given the necessary training Thus the complete integration of the malaria logist into the general public health team might be envisaged

PRESENT OBSTACLES

From what has preceded it may be concluded that, thanks to the effectiveness of modern adulticidal spraying against anophelines, it is not unreasonable to begin planning for world wide eradication of malaria At the present time there are no obvious technical or economic reasons why malaria could not be driven out of the Americas, Europe, Australia, and much of Asia within the next quarter of a century As regards tropical Africa, the situation is not quite so promising, owing to the current relatively high costs of malaria control in that region and to the absence thus far of any convincing success on a country wide scale There is no reason to doubt that the difficulties will be overcome but one cannot yet foresee the elimination of malaria from Africa in the near future This is true also

of several islands of the Pacific and a number of jungle covered areas of south-east Asia.

The principal obstacles now delaying complete coverage of malarious areas with modern residual spraying are not so much technical or biological or economic as they are social Among such obstacles are wide spread absence of an educated and effective public opinion with regard to malaria elimination in many of the most highly malarious countries, much too limited use of sound administrative principles in the practice of public health lack of sufficient numbers of specially trained personnel for country wide malaria control operations, failure by too many public officials and influential citizens to recognize the economic significance of malaria and its control, and insufficient international co ordination in planning region wide malaria elimination projects Great progress is evident in dealing with these obstacles, but much remains to be done

The question of resistance of malaria vectors to organic toxicants discussed in the previous section (page 90), is also of great importance and must be kept in mind As has been suggested, it is a reason for pushing control projects forward as widely and as rapidly as possible so that malaria eradication can be attained before such resistance destroys the usefulness of the insecticides

IMPLICATIONS OF MALARIA ERADICATION

The impact of eradicating malaria from a country will of course, vary from place to place, depending on the initial degree of malariousness and on existing social conditions In some areas removal of the burden of malaria will undoubtedly bring about important social and economic changes including not only a stimulation of agriculture, industry education and public welfare generally, but also in some instances an immediate increase in population pressure



Health education is needed to win public support for malaria control. Here a public health nurse is shown addressing a group of villagers in India explaining to them the operations which are to be undertaken by a WHO/UNICEF malaria-control team.

In Sardinia, the economic and social welfare of the people has already been greatly and quite visibly improved by the elimination of malaria. In British Guiana, malaria control has lowered death rates so dramatically that it has aroused some pessimistic warnings and has given rise to such statements as "The gadgets of short-term public health can speed the production of festering slums much faster than was possible in the past."

One outstanding writer has posed the question "But is the world the better for having a larger number of healthy people dying of starvation rather than letting them

die of malaria?" Professor A. V. Hill has pointed out "It is *not* a question only of food if a higher standard of life is to become universal with education, communications, housing, reasonable amenities and public health a far greater demand will be made on all such natural resources as power, chemicals, minerals, water and wood. One is left wondering how long these can possibly take the strain."¹⁰

The question of population pressure is not at all as simple as one might think from the comments of some writers. The world population today approaches 2.5 billion

HILL, A. V. (1953) *Nature* (Lond.), 170, 388.

and it has been predicted that it may reach 4 billion (maximum figure) by the year 2000. Who knows which experts are correct among those who variously estimate that today's knowledge of agriculture should make possible the production of adequate, nutritious food for a world population of 4, 5 or up to 13 billion people? Who can estimate the effect in the future of greater saving of rainfall, or of the economic utilization of sea water for irrigation of vastly multiplied fish farming of widespread, practical photosynthesis of the production of food from chemicals, woods, and crops that are not edible today? The equation of population with its three main variables—people, energy, and food—is vastly more complicated than any present formulation.

The answers to the natural query about the possible disastrous demographical effects of malaria control are first, that no one can have the prescience necessary to justify, because of presumed future good, the present withholding from any people of those methods that are available for the cure and prevention of disease, secondly that no one knows or can predict exactly what total population the world can adequately support,

thirdly that there is as yet no widespread understanding of the possibilities and benefits of family planning although in certain overpopulated countries, such as India the subject is now receiving much attention.

Again quoting Professor Hill: It is true that scientific research has opened up the possibility of unprecedented good or unlimited harm for mankind, but the use that is made of it depends in the end on the moral judgments of the whole community of men. It is totally impossible now to reverse the process of discovery: it will certainly go on. To help to guide its use aright is not a scientific dilemma but the honourable and compelling duty of a good citizen.

Malaria eradication is certainly not an end in itself. Malariaologists, physicians and sanitarians should, to an ever greater extent integrate their activities into those of agriculturists, industrialists, social scientists, economists, educators and political and religious leaders. But it has been repeatedly demonstrated that in highly malarious countries one of the first steps in the improvement of public welfare is the removal of malaria which, like a blanket, stifles all aspects of human endeavour.

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MALARIA TERMINOLOGY

*Report of a Drafting Committee
Appointed by the World Health
Organization*

SIR GORDON COVELL
P F RUSSELL &
N H SWELLENGREBEL

1953 62 pages 8 figures
Price 5/- \$1.00 Sw fr 4—

*This monograph brings up to date and
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Analogous French glossary prepared by M A Vauzel E. Roubaud & H. Galliard
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THE WORK OF WHO 1954

A Review of the Annual Report of the Director-General

Two themes recur in the Annual Report of the Director General for 1954¹ the need for more trained health personnel and the basic importance of environmental sanitation. Some idea of the significance of the former may be gained from the fact that about 40% of the year's projects in all regions were mainly concerned with education and training. With regard to environmental sanitation Member governments were urged to assign it high priority in all health programmes and to make amelioration of sanitary conditions a part of most projects whether for the control of communicable disease or for the improvement of the health of particular population groups such as mothers and children.

The Organization's work during the year reflects an increasing recognition of its real function—that of technical adviser in the development of national health services and of international co-ordinator of health activities, rather than a source of supplies and equipment and an aid for the temporary alleviation of certain problems.

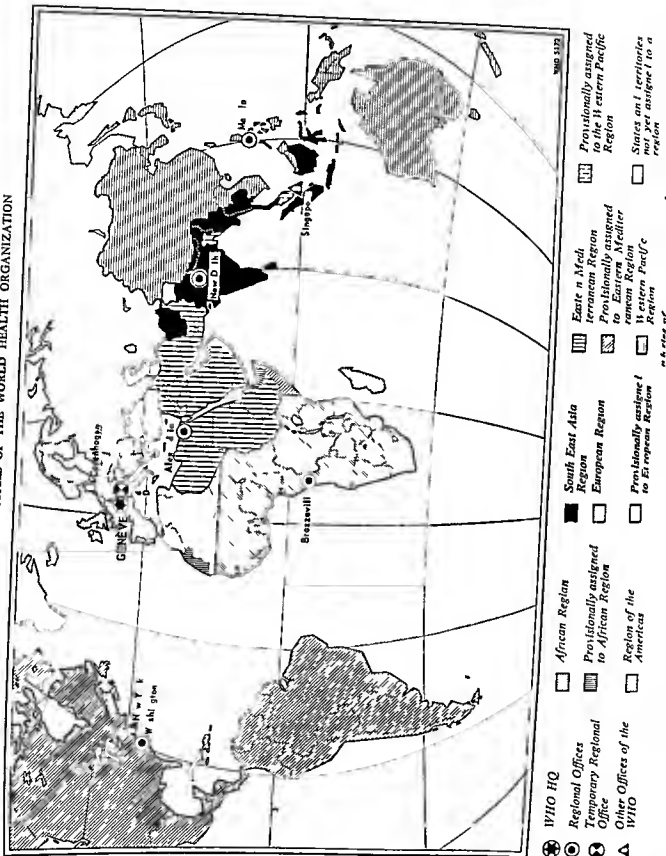
1954 also brought an increasing trend towards inter regional health work and more co-operation in inter-country and inter regional projects particularly seminars conferences and training courses. This trend too emphasizes WHO's function as a co-ordinator and an international clearing house for exchange of scientific information.

Greater stress on research is noted in this year's Report in the control of communicable diseases constant study is necessary in order to meet new problems as they arise and to further knowledge of the etiology prevention and treatment of specific infections. The Organization is co-ordinating or actively supporting research on a wide range of subjects.

The Director General in concluding his introductory statement to the Annual Report calls attention to the "new challenge which faces the Organization as a result of the modern discoveries of science and medicine." WHO may sooner or later have to assume responsibility for assessing the possible effects on health of the unprecedented interference with natural processes which is now taking place in many parts of the world. It may have to answer questions such as: To what extent is the balance of nature being affected by the wholesale destruction of insects? What will be the long term results of the extensive use of antibiotics? How will the disease patterns of populations be influenced by the present intense efforts to improve standards of environmental sanitation and hygiene? How important is the contamination of the air soil and water caused by the increased use of atomic energy? Every effort is being made to enable the Organization to assume its new responsibilities and to continue fulfilling its obligations of assuring, through co-operation and mutual aid among countries health prosperity and peace to all mankind.

¹ World Health Organization (1955) *The work of WHO 1954 annual report of the Director-General to the World Health Assembly and the Executive Board (Off. Rec. Wld Hlth Org 59), Geneva. x + 109 p. Price 10/- \$2.00 £ 5/-*

FIG 1 REGIONS AND OFFICES OF THE WORLD HEALTH ORGANIZATION



reported in former years. Gastro-intestinal infections and parasitic infestations continued to be a major concern emphasizing the need for improvements in environmental sanitation.

As in most regions obtaining and making proper use of trained health personnel hindered progress in some countries. Education and training programmes therefore received considerable attention. As part of a continuing effort the Regional Office and zone offices in collaboration with other interested agencies went ahead with the systematic accumulation of quantitative data about the medical schools in Latin America on the basis of which fellowships are to be awarded visiting professors and equipment provided for some schools and travel grants given to senior officials of selected schools.

Several seminars and training courses were sponsored by WHO during the year in the Region: one a short course on diagnostic methods in brucellosis held in Mexico City in March in collaboration with the FAO/WHO Brucellosis Centre and the Mexican Ministry of Health and another a seminar on sanitary engineering held in Caracas, Venezuela in May. A long term project for improving nursing education in Bolivia went forward during the year and teaching activities were continued at the tuberculosis training centre in Guayaquil, Ecuador. Five projects for education and training in statistics were also assisted by the Organization.

There are an increasing number of inter-country projects in the Americas. Efforts to rid the continent of *Aedes aegypti* are still in progress. And at the XIV Pan American Sanitary Conference which served as the Regional Committee meeting for the year a resolution was adopted for the promotion of campaigns against malaria with the object of eradicating this disease from the Western Hemisphere.

South East Asia

The funds allocated to health are gradually increasing in most of the countries of South East Asia as the following figures indicate.

Country	Year	Health budget	Percentage of total national budget
Afghanistan	1953-54	13 766 825 afghanis	
	1953-54	5 74 342 afghanis	
Burma	1952-53	19 959 000 kyats	3.09
	1953-54	50 883 000 kyats	4.2
Ceylon	1953-54	90 728 577 rupees	9.57
	1953-54	95 463 474 rupees	14.00
Indonesia	1953	797 118 350 rupiahs	1.7
	1954	328 663 000 rupiahs	2.4
Thailand	1953	127 039 49 bahts	6.8
	1954	114 483 45 bahts	5.6
India	While actual figures are not yet available, there has been a steady rise in health budgets at both the central and state levels, under India's First Five Year Plan, which provides for large subsidies to be given by the Central Government to the States.		

These increases are in addition to funds for health work provided in the budgets of other ministries such as for example money spent on urban and rural water supplies.

This expansion of health services calls for an adequate administrative structure at all levels. Internationally recruited experts have been or are to be attached to the health directorates in Afghanistan, Burma, Ceylon and Indonesia.

The most important single health problem in South East Asia is still basic environmental sanitation and plans have been made for more assistance in sanitary improvements to all the countries of the Region. The problem is complicated by the fact that about 85% of the people of the Region inhabit rural areas. Several approaches are being tried, among them the organization of various kinds of rural health units, often with emphasis on environmental sanitation and on maternal and child health.

THE REGIONS

Africa

The special conditions of the African Region necessitate extensive surveys and careful planning before health activities are begun. Most WHO programmes in the Region are still in the formative stage. While considerable progress was made in 1954 in campaigns against communicable diseases and in efforts to improve maternal and child health, nutrition, nursing care, and environmental sanitation, the accomplishments represent only a very small fraction of what needs to be done. Among the chief obstacles still to be surmounted is the difficulty of obtaining qualified personnel for the Regional Office as well as for field projects.

One of the highlights of the activities in the Region in 1954 was a conference on African onchocerciasis held in October in Leopoldville. This conference, attended by more than thirty experts from many countries and territories in Africa, from countries of Europe and the Americas, and from several non governmental organizations, did much to elucidate the problem of onchocerciasis in Africa and to stimulate national and international control programmes.

During the year a survey of tuberculosis incidence was continued and a study of health statistics in the Region was made. Research was sponsored on a number of problems such as the resistance of body lice to insecticides, which is being investigated by the South African Institute for Medical Research, and yellow fever immunity and epidemiology in Africa which is being studied at the Virus Research Institute Entebbe, and at the South African Institute for Medical Research.

For the first time in four years there was an increase in the number of fellowships granted in the Region: 84 in 1954, as compared with 27 in 1953. Although most of the awards were for individual training fellowships, were also granted for group-training programmes organized or assisted by WHO.

With regard to future trends, special attention is to be given to programmes in environmental sanitation and health education and to the training of large numbers of personnel. All disease control activities are to be based on careful studies of methods to determine which may be most suitable for the Region and in planning and carrying out all projects, the advice of the regional sociologist will be taken into account particularly for work in the technically less developed countries.

The Americas

In the Americas there has been considerable progress in the development of public health services during recent years. This progress must however be assessed in relation to the expanding needs of a population which is increasing rapidly especially in tropical areas. The population of Latin America now almost equals that of the United States of America and Canada and its rate of increase is high. A great effort is consequently required to raise the health services to a level which will not only meet present requirements but also provide for continuous expansion commensurate with the growth of future needs. Leadership, energy, economic resources and trained personnel are required to develop public health services at the same time it is of utmost importance to continue assistance to governments in special campaigns against communicable diseases susceptible to mass attack.

The health problems of the Region remained essentially the same in 1954 as those

The relative importance of certain communicable diseases as health problems is changing in Europe. Smallpox, malaria, and venereal diseases are no longer of major concern. Some countries still need to devote more effort to the prevention of childhood diseases; for example, it has been estimated that the medical care of 60 663 reported cases of diphtheria cost European countries at least two million dollars in 1953. Virus and rickettsial diseases are receiving an increasing amount of attention in Europe and the laboratory aspects of these diseases are being studied.

Of considerable interest are campaigns against trachoma in certain countries of the Region.

"Although the high epidemicity of trachoma and seasonal acute conjunctivitis in certain areas is recognized as being due to environmental factors, attempts have been made recently to control these infections by mass chemotherapy and by antibiotics. In North Africa, where the two diseases coexist, the control of trachoma depends primarily on that of seasonal conjunctivitis. From pilot projects initiated, with the assistance of WHO and UNICEF in Morocco (French Zone) and in Tunisia, it is planned to develop operations which will be applicable on as large a scale as economic resources will permit. The first results have been encouraging. During 1954, 400 000 individuals were treated in the two project areas in field campaigns against seasonal conjunctivitis. As effective treatment of trachoma in the early school years eliminates a source of infection and minimizes the risk of late complications of the disease resulting in blindness, a programme of systematic treatment of trachomatous children is being introduced into the schools; approximately 50 000 received antibiotic treatment in 1954. Modified projects were planned, with technical advice from WHO for Spain, where seasonal conjunctivitis is less of a problem than in North Africa, and for Yugoslavia, where trachoma exists in a nearly pure form. WHO has made special efforts to standardize methods of recording and evaluating results in order to facilitate the comparison of data and experience between countries.

The Regional Committee is soon to review the long term objectives of WHO in Europe. Though this evaluation of present and

planned programmes may not involve any substantial changes, it is hoped that it may make possible the initiation of work on some problems of concern to the Region which have not yet been dealt with, such as the public health aspects of certain chronic killing and disabling diseases, the unification of health regulations in Europe (e.g. those on food sanitation), the human factor in traffic accidents and human relations in expanding industries.

It is expected that in the future the work of WHO in Europe will be increasingly concentrated on the expansion of co-operation in public health work in the Region and the promotion of education and training programmes.

Eastern Mediterranean

WHO's assistance to governments in the Eastern Mediterranean Region is directed towards three main objectives: strengthening national health administrations; controlling communicable diseases; and improving the training of health personnel, particularly by developing training facilities within the Region. There seems to be greater confidence in the work of the Organization and better understanding of its purposes, reflected in the changing nature of requests for aid. Governments now make fewer demands for large quantities of supplies and equipment and are more likely to request technical advice and assistance with education and training projects. It is foreseen that the regional programme will probably become less dependent on demonstration and field projects and will be concentrated increasingly on the development of education and training facilities for both professional and auxiliary workers. In the Eastern Mediterranean Region, the answer to the need for trained health personnel seems more likely to be found in properly trained auxiliaries than in fully trained professional workers.

Much attention is being given by WHO to the training of all categories of medical and paramedical personnel for which there is great need in the Region

Co operation among the numerous international and bilateral health aid agencies working in the Region is very important and health co ordination committees have now been established in all the countries of South East Asia

Programmes for the control of communicable diseases, for improving health facilities and for training health personnel were continued during 1954. A project which came to an end during the year was one in Bangkok, Thailand in which maternal and child health and nursing were combined. This project is described in some detail in the Annual Report and provides a good example of how integration of health services can be accomplished

The objectives of this project (Thailand 6) were to raise the standard of health of the people particularly of women and children by improving and enlarging the existing health services and by providing better facilities for training all types of health personnel engaged in maternal and child health work and to demonstrate in one urban and one semi rural area the pattern of community health services in which the preventive curative and social aspects of care are combined

This project had assistance from WHO from September 1951 until 1954. The WHO staff included an officer in maternal and child health, a public health nurse, a sanitarian and an instructor in midwifery. A social worker was provided by the United Nations

The work was done in a number of units established under this project. In addition to the traditional maternal and child health activities such as ante natal and post natal care and infant care, paediatric venereal disease and tuberculosis clinics were held on the premises. The local health workers and the public were thus shown how medical services could be centralized and unified. Immunizations and health education in the centres and homes also formed part of the services of these units

There was close liaison between hospitals, the clinics and the maternal and child health project. A twenty four hour domiciliary midwifery service was established for the first time and over 800 women

were delivered in their homes between June 1952 and May 1954. The integration of school health services into the general health services was begun by including one school in the project

"Trainees from the provinces who came to Bangkok for refresher courses carried out, on their return home the methods that had been demonstrated in the projects units

During the period infant mortality in the project area was nearly halved. The demand for all types of medical services has risen and there is pressure from the public for more centres to be established"

Health activities in South East Asia are expanding rapidly, and an attempt is being made to integrate all projects into national health programmes and services. Most important is a gradual change in attitude which governments are experiencing, a trend towards emphasis on basic preventive work, such as sanitary improvements and health education, rather than on building hospitals

Europe

Despite considerable diversity in health problems, in patterns of health services, and in stages of economic development, the countries of Europe constitute what is probably the most uniform of all the WHO regions. This uniformity makes possible a concentration of personnel and finances on activities of interest to several or all of the countries of the Region. In fact, as the Annual Report points out, the work of WHO in Europe derives its primary stimulus from the inter country programmes"

Among the inter country programmes in 1954 were seminars on alcoholism, meat hygiene, and public health nursing conferences on water pollution and water chlorination, immunization, the mental health aspects of the care of the child in hospital and school health, and training courses of various types and lengths in anaesthesiology, public health administration, rehabilitation of the handicapped, social paediatrics, tuberculosis and venereal disease control

The relative importance of certain communicable diseases as health problems is changing in Europe. Smallpox, malaria and venereal diseases are no longer of major concern. Some countries still need to devote more effort to the prevention of childhood diseases; for example, it has been estimated that the medical care of 60 663 reported cases of diphtheria cost European countries at least two million dollars in 1953. Virus and rickettsial diseases are receiving an increasing amount of attention in Europe and the laboratory aspects of these diseases are being studied.

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It is expected that in the future the work of WHO in Europe will be increasingly concentrated on the expansion of co-operation in public health work in the Region and the promotion of education and training programmes.

Eastern Mediterranean

WHO's assistance to governments in the Eastern Mediterranean Region is directed towards three main objectives: strengthening national health administrations, controlling communicable diseases and improving the training of health personnel, particularly by developing training facilities within the Region. There seem to be greater confidence in the work of the Organization and better understanding of its purposes reflected in the changing nature of requests for aid. Governments now make fewer demands for large quantities of supplies and equipment and are more likely to request technical advice and assistance with education and training projects. It is foreseen that the regional programme will probably become less dependent on demonstration and field projects and will be concentrated increasingly on the development of education and training facilities for both professional and auxiliary workers. In the Eastern Mediterranean Region the answer to the need for trained health personnel seems more likely to be found in properly trained auxiliaries than in fully trained professional workers.

FIG 2 HEALTH DEMONSTRATION PROJECT IN
CALIOUB EGYPT



*Team members visit a village to collect data in
a survey of enteric diseases*

Seminars are being planned as one of the means of furthering education and training of professional personnel in the Region. Among those for which plans have been made are so called travelling seminars in which senior public health administrators are to visit countries in the Region to discuss problems of common interest and to study methods of solving them. Participants in the

first seminar of this type will visit Egypt, Iraq and the Sudan.

Efforts are being made to develop integrated health programmes in the Region. In general, there is a gradual trend towards fusing curative and preventive services and towards co-ordinating those for health with other social services.

During 1954 some of the projects in the Region were directed towards the control of malaria on an inter country basis (see page 113), tuberculosis, trachoma and the treponematoses. The health demonstration in Caliouh Egypt continued to help in the development of a suitable pattern of health services for rural areas of the country. The number of maternal and child health programmes assisted jointly by WHO and UNICEF, increased greatly.

Attention began to be focused on mental health. Surveys conducted by consultants in Egypt, Iran, Iraq, Jordan, Lebanon, Sudan and Syria led to the initiation of work on this public health problem in several countries. A WHO consultant is helping the Government of Jordan to develop a full diagnostic and therapeutic service, occupational therapy and training—the first project of its kind in the Region. This project also involves revising out of date laws and medical procedures relative to the mentally ill, not just in Jordan, but also in most of the countries of the Region where the attitude of the public concerning mental health needs to be reorientated and where professional staff must be trained. Another WHO consultant is advising on the organization and operation of a school for backward children which is being established in Baghdad.

Environmental sanitation also began to be stressed becoming an indispensable component of almost every WHO assisted health project in the Region. To help meet the great need for regional training facilities for sanitarians, WHO is assisting in several training schemes in Egypt and Lebanon.



Spraying with residual action insecticide at Long San Sarawak

Health education of the public is being given due emphasis in efforts to improve environmental sanitation

Western Pacific

As in other regions the work of WHO in the Western Pacific Region has one basic purpose to strengthen national health services. This can be done only if the supply of trained personnel is adequate and if their services are fully used. The acute shortage of trained personnel in some countries has had a detrimental effect on programmes. WHO staff have sometimes had to work without the promised national counterparts with the result that the handing over of projects to national health workers has been delayed or that the appointments of the international staff have ended before counterparts were sufficiently trained to take over the responsibilities. The increasing number of requests from the governments for assistance in education and training work—whether in the form of fellowships, the development of training centres, exchange programmes or seminars—shows that national health administrations are aware of the seriousness of the problem.

An outstanding feature of 1954 with regard to WHO assistance in education and training activities was a growing interest in exchange programmes between medical schools within and outside the Region. This resulted largely from the success of an exchange of professors arranged between the Johns Hopkins University School of Public Health and the Institute of Hygiene of the University of the Philippines. Three other similar programmes are now being planned with the Regional Office acting as originator and co-ordinator.

During the year a larger number of fellowships was awarded for study within the Region, particularly in Australia, Japan, New Zealand and the Philippines. Of the 59 fellowships granted, 28 were of this type.

An important seminar on dental health took place in New Zealand in May 1954.

Thirty-seven participants from twenty countries in three of the WHO regions attended this seminar, which provided an opportunity for an exchange of views among experts on dental health on some of the important dental problems in different parts of the world.

Two schools of public health were established during the year—one in Korea, as a result of the WHO/UNKRA Health Planning Mission, and the other in Taiwan, where the Institute of Public Health was opened in February after the Institute of Tropical Medicine of the National University had been reorganized.

As in most of the other WHO regions the fundamental importance of environmental sanitation began to receive recognition in the Western Pacific. The Annual Report describes the situation thus:

"Diseases susceptible of control by known techniques of environmental sanitation are a considerable problem in many countries. Only a few urban communities have water supplies which meet minimum public health standards and most inhabitants of rural areas use water which if not obviously contaminated is certainly suspect. Sanitary disposal of human excreta is practised in only a few cities and towns. In many communities and in almost all rural areas soil pollution and contamination of drinking water are evident and few or no measures are taken to deal with other environmental problems such as those connected with housing, refuse disposal, rodents and flies. Every effort has been made to assist governments to define their problems and to study plans for improving environmental sanitation."

Among the health projects in operation during 1954 in the Western Pacific Region were malaria and insect control in Taiwan, bilharziasis control in the Philippines (a pilot project), public health education at the University of Malaya, Singapore and a demonstration and training project in venereal disease control in Taiwan.

GENERAL REVIEW OF 1954

Following the practice established in the report of the previous year the Annual Report for 1954 gives a comprehensive picture of the Organization's work during the period covered in the form of a detailed project list in which are included the project number the source of funds and the co-operating agencies the dates of operation and a description indicating the aim of the project the type of assistance provided by WHO the probable duration of assistance and the work accomplished The narrative account of the year's activities is therefore a sort of general summary in which certain projects or developments are singled out for particular attention

The pattern of the Organization's work has now become somewhat fixed In most instances the activities of 1954 were a continuation along already established lines of what was begun in previous years

COMMUNICABLE DISEASES

Of special interest in 1954 were the problems which further experience of certain health measures brought to light and the studies which were undertaken to try to solve these problems The Annual Report points out, for example that the results of large scale efforts to prevent communicable diseases cannot be forecast, that clinical and laboratory methods of proved efficacy in individual cases do not always yield the results expected when applied to communities and that public health measures effective under certain epidemiological conditions may be disappointing in others

Attempts to solve problems encountered in WHO-assisted field activities have led to further stimulation and co-ordination of research by the Organization Studies on the absorption of the insecticide into certain types of mud walls are under way to determine why DOT house spraying has failed in certain areas investigations of the relationship between strains and types of treponemes and their sensitivity to various antibiotics are being made to find out why the results obtained in different places vary and

laboratory research on vaccines is being conducted to discover why vaccination programmes have not always been satisfactory

Malaria

The problem of the development of anopheline resistance to insecticides which made 1953 a turning point in malaria control assumed even greater significance in 1954 The resistance to insecticides actually interfered with control efforts in Greece and in Indonesia numerous cases of the infection were reported in areas which had previously been sprayed with insecticides Resistance to insecticides of the local vectors in Lebanon and changes in insect behaviour in DDT sprayed localities in Indonesia were also described by WHO field personnel

To help meet this problem WHO supplied standard testing outfits to enable field personnel and various malaria institutes to carry out tests on the susceptibility of local anopheline species to the insecticides being used so that any changes in susceptibility might be quickly detected and the necessary steps taken Reference laboratories in

London and in Rome are collaborating in this work

The Organization is coordinating research carried out by seven collaborating

institutes in the Americas, in Asia, and in Europe on the reaction between certain types of mud walls and non volatile insecticides

FIG 4 MALARIA CONTROL IN LEBANON



Insect collectors search for mosquitos in a constall as part of the entomological work in malaria control in Lebanon

WHO-assisted malaria-control projects were in operation during the year in Afghanistan Burma the Caribbean area the Dominican Republic French Cameroons Indonesia Iraq Lebanon Liberia Paraguay the Philippines Sarawak Saudi Arabia Syria and Taiwan. The projects in Lebanon and the Philippines ended during the year. A number of new projects were initiated—in Nepal Nigeria Syria and East Africa.

A good illustration of WHO aid in inter-country malaria control is the programme which embraces a number of countries in the Eastern Mediterranean Region.

"During the last five years the Organization has assisted the Governments of Iran, Iraq, Lebanon and Syria to develop malaria control. Similar work has been carried out among the Arab refugees especially in Jordan under the auspices of UNRWA and assistance has been given to Israel in the form of technical advice and fellowships.

This group of countries forms a more or less isolated bloc stretching from the eastern shores of the Mediterranean to the desert and mountainous border of Pakistan. It is bounded on the north by mountains and the Caspian Sea, and on the south by desert and the Persian Gulf. Turkey in the European Region, has close links with this group. Generally speaking there is free communication among most of these countries, with no great natural barriers and they have similar malaria-control problems. In ancient times much of this country was irrigated and very fertile and provided food for large populations. With the passage of centuries the irrigation systems have fallen into ruin, malaria has become severe and widespread, and there has generally been extensive depopulation.

In attacking the problem of malaria in this area, the first step taken jointly by most of the governments and WHO has been to set up projects, with surveys, demonstrations of modern methods of malaria control and the training of staff. In Iran, aid was also given in the establishment of a malaria institute.

With the knowledge gained in the demonstration projects control measures were introduced over increasingly large areas. In Lebanon, such measures now extend to almost the entire country. In this effort towards nation-wide control the countries have also been aided by UNICEF and by the United States Foreign Operations Administration (FOA) which has made extensive grants for supplies, equipment and transport. Already some five and a half million people are protected from malaria.

"As control measures within neighbouring countries expand and reach the frontiers, there is an evident need for inter-country co-ordination. Moreover experience in other regions has shown that if control measures can be established to ensure complete coverage over wide areas for long enough to break the chain of transmission it will probably in the end be possible to suspend expensive spraying operations without a recrudescence of malaria.

"Accordingly an inter-regional conference has been planned for representatives of the above mentioned countries of the Eastern Mediterranean and contiguous countries of Europe and from other organizations to discuss common problems and plan a co-ordinated campaign to free the area completely from malaria.

"Much hard work remains to be done and large financial contributions will be required both from the countries themselves and from the supporting organizations. But the ultimate results, both economically and in terms of human welfare are incalculable. It is even possible that vast tracts of this area may eventually resume their ancient fertility.

"Thus it is seen that demonstration projects which are developing into country-wide control measures and finally into inter-country programmes may lead, within the foreseeable future to the elimination of an ancient scourge from a group of countries whose population totals some thirty-two million."

An important development during the year was the decision taken at the XIV Pan American Sanitary Conference to intensify and co-ordinate malaria-control efforts in an effort to eradicate the disease from the Western Hemisphere. Regional malaria control was also discussed at another conference in 1954—the Second Asian Malaria Conference for the South East Asia and Western Pacific Regions held in the Philippines.

The monograph *Terminologie du paludisme*² which is the French equivalent of the previously published *Malaria terminology* was issued during the year and a monograph on the chemotherapy of malaria was prepared for publication in 1955. A number of the *Bulletin of the World Health Organization*³ was devoted solely to the subject of malaria control.

² Vucoel M. Rouba d. E. & G. Hurd, H. (1954) *Terminologie du paludisme*. Genève (Organisation Mondiale de la Santé, *Série de Monographies*, N. 23).

³ Bull. Wld Hlth Org. 1954 11, 509-890.

Treponematoses and venereal infections

In 1954 WHO assistance in the control of endemic treponematoses continued to have a dual purpose—to eliminate such infections as a public health problem, and to strengthen rural health services. Projects which were begun in previous years were maintained: yaws control in Haiti, Indonesia, Liberia, the Philippines and Thailand, endemic syphilis control in Yugoslavia, and venereal disease control in Afghanistan, Burma, Ecuador, Ethiopia, Iran, Paraguay, Saudi Arabia, and Taiwan. New campaigns against yaws and other non-venereal treponematoses were started in Bechuanaland, Malaya, Nigeria, and Syria and against syphilis in Morocco (French Zone). UNICEF assisted materially in many of the projects.

By the end of the year, more than twenty-five million people had been examined and six million treated in the campaigns in Haiti, Indonesia, Laos, the Philippines, Thailand and Yugoslavia. The average cost of treatment and examination in these projects was lower than that previously recorded—approximately \$1.25 per patient or contact treated with penicillin and \$0.12 per person examined, including all national and international expenditures.

Co-ordination of research on the treponematoses is an important part of the Organization's work in this field. Close contact is maintained with experts and institutions carrying out research on the use and value of antibiotics other than penicillin and some investigations of this subject are being made at the International Treponematoses Laboratory Center. The interest in other antibiotics arises from the realization that treponemes may, like many other microorganisms, eventually develop resistance to penicillin, which is being increasingly used—and misused—throughout the world. New penicillin salts and preparations are also

being tested and it has been found that 'effective penicillinaemia can be obtained for a longer period with a lower dosage of these new [amine] salts after a single injection than with PAM.

Studies on the fundamental nature of treponemes and on the relevant tests—the *Treponema pallidum* immobilization (TPI) test, the *Treponema pallidum* immune adherence (TPIA) test, and the *Treponema pallidum* agglutination (TPA) test—were continued in 1954 with WHO co-operation and co-ordination. The International Treponematoses Laboratory Center and the WHO International Serological Reference Laboratory served as focal points for these and other investigations.

Several publications on venereal diseases and treponematoses were issued by the Organization during the year: a monograph on donovanosis,⁴ a number of the *Bulletin*⁵ dealing entirely with the reorientation in the treatment of venereal syphilis in the last decade, and an issue of the *Chronicle*⁶ which reviewed the present situation with regard to the treponematoses and WHO's role in combating them.

Tuberculosis

"The steep decline in tuberculosis mortality that has been reported in recent years in countries where reliable statistics are available has created the impression that tuberculosis might soon be brought completely under control. But tuberculosis morbidity has not decreased to the same extent and in countries where within five years the mortality has diminished by about half the number of reported cases of tuberculosis has dropped little and the number of known infectious cases has sometimes even increased."

It is as yet impossible to judge what may be the ultimate effects of the increasing use

Rajam R. V. & Rangiah P. N. (1954) *Dona disease (granuloma inguinale) in Malaya*. Geneva (World Health Organization Monograph Series No. 24).

Bull. Wld Hlth Org. 1954 10: 501-70.

Chon. Wld Hlth Org. 1954 8: 37-114.

FIG 5 YAWS CONTROL IN LAOS



The WHO team leader and his Laotian counterpart examine children and demonstrate methods of diagnosis and treatment to field workers

of chemotherapy in tuberculosis. Already, however, new problems have to be faced in dealing with tuberculosis as a public health problem: mortality figures can no longer be used as an index of the incidence of the disease and other indices will have to be devised and agreed upon internationally, the prolongation of life in patients seriously afflicted with the infection may result in greater need for public health measures for their rehabilitation and assistance, and the epidemiological significance of widespread chemotherapy will have to be determined. (While a large proportion of cases seem to be rendered non-infectious by the drugs, some remain infectious, and others despite apparently successful treatment relapse into an infectious state, raising the question of drug resistance.)

Problems such as these are being given serious consideration by WHO. It is urgent, for example, to determine how effective ambulatory chemotherapy may be in areas where institutional facilities are not, and cannot be, adequate to meet the need for isolation and treatment. Carefully controlled field investigations are required to answer questions of this sort.

In the meantime, WHO is continuing to give assistance to governments in tuberculosis control along two main lines: mass BCG vaccination campaigns, and the establishment of tuberculosis teaching and training centres. Projects in one or another of these categories were in operation in twenty-eight countries during 1954. About thirty-two million persons were tested with tuberculin during the year, and about eleven million were given BCG vaccination. The cost of the WHO field staff and of the equipment and supplies for all the BCG campaigns and the cost of the equipment and supplies for some of the training centres were borne entirely by UNICEF.

Gradually the type of WHO assistance given to BCG projects is changing: more

attention is being paid to planning and re-examining schemes, and to determining techniques and evaluating results than to the actual carrying out of mass programmes. In accordance with this development, three regional BCG assessment teams were created during 1954—one for South East Asia, one for the Western Pacific, and one for the Eastern Mediterranean. The doctors and nurses who comprise these teams have all had special training at the Tuberculosis Research Office, which is acting as technical supervisor of their work and is analysing and interpreting the data which are being gathered. The results of the evaluations already made are most significant.

Along the same lines, a fact-finding pilot study was made during the year in the Sudan in preparation for a mass vaccination campaign—the first study of its kind.

Work at the Tuberculosis Research Office continued to add to knowledge of BCG vaccination and to have practical application in the campaigns being carried out in different countries. The Office's task of preparing and publishing detailed statistical records of the mass BCG campaigns was completed during the year. Reports have now been published on campaigns in sixteen countries and on the campaign conducted among the Palestine refugees. These reports document the tuberculin testing of twenty-two million people and the vaccination of eleven million; they provide a permanent and detailed record of what was undoubtedly the largest most uniformly carried out immunization programme ever attempted.

The possibility of combining BCG vaccination with other disease control measures has begun to be envisaged. In 1954 two combined programmes were started, one a study of simultaneous vaccinations including BCG in certain population groups and the other a study of BCG vaccination in combination with penicillin treatment of yaws. The

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potential significance of this development is suggested in the Annual Report

"In some countries the BCG campaign has been the first public health activity particularly in rural areas in which preventive measures have been applied effectively to large groups of people. Con-

siderable experience has now been gained in mass campaign organization and techniques and since similar tactics have been used in the control of other communicable diseases—yaws for example—public health administrators are asking whether several preventive measures cannot be applied at the same time in one mass campaign. Simultaneous vaccination

FIG 6 TUBERCULOSIS CONTROL IN EGYPT



A WHO nurse checks a reaction to the tuberculin test

During the year WHO consultants visited Egypt, Israel, Lebanon, Mexico, Portugal, Spain, and Yugoslavia to assist in rabies control.

Other zoonoses on which work, largely of a research type, was continued during 1954 were Q fever, leptospirosis, animal tuberculosis, and hydatidosis.

Considerable attention was given to problems of food hygiene. A WHO/FAO seminar on meat hygiene, organized by the WHO Regional Office for Europe, was held in Copenhagen. A WHO/FAO expert committee on the same subject met towards the end of the year, and the FAO/WHO/UNICEF working group on milk and milk products continued its work, which included surveys in Egypt and in Yugoslavia to advise the Governments on milk programmes (see also p. 127).

Virus and rickettsial diseases

WHO's work on virus diseases was "broadened and integrated" during 1954, with particular emphasis being given to the need to bring virological techniques into practical use for diagnosis and control of these diseases.

The influenza laboratories continued their studies on the epidemiology of influenza viruses. The final reports on the 1952-53 epidemic were published. A study of two hundred and twelve viruses isolated by the centres was carried out by the World Influenza Centre and shed light on the epidemiology of the disease. In April an informal meeting of a group of experts was held to discuss problems connected with influenza vaccines, particularly in Europe.¹⁰

A programme for the study of poliomyelitis was developed and progress made in the organization of a network of labora-

tories to carry out the laboratory part of the programme. Among the subjects of research which are being followed carefully by WHO are the development of vaccines and the prophylactic use of gamma globulin. A monograph on poliomyelitis was in press at the end of the year¹¹ and a study of the incidence of poliomyelitis in the world in 1953 was prepared.¹²

Yellow fever surveys were undertaken under the aegis of, or in co-operation with, WHO in several States and territories in Africa—Ethiopia, the Federation of Rhodesia and Nyasaland, the Union of South Africa, South West Africa, and the Sudan. In the Americas *Aedes aegypti* eradication campaigns were continued. The provisions of the International Sanitary Regulations relating to yellow fever were reviewed by the Committee on International Quarantine and recommendations for their revision submitted for consideration by the Eighth World Health Assembly (see page 129).

Investigations of dried smallpox vaccines went forward during 1954. Carefully controlled field trials of two dried vaccines were begun and are expected to last at least two years. A study of smallpox control in the Western Pacific Region was made during the year.

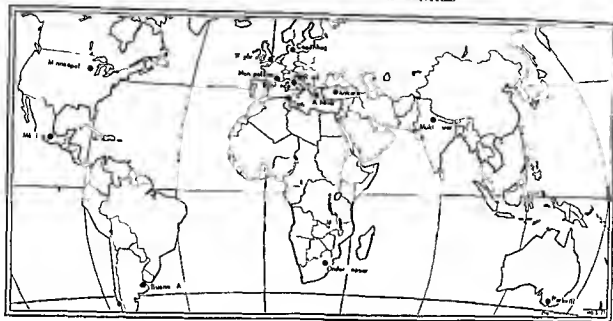
Requests for aid in trachoma control increased in 1954. New field projects were started and information on the results of the pilot projects in operation was sought by governments, non-governmental organizations, and trachomatologists. "All the current field activities against trachoma form one part of a general plan to test the efficacy of a proposed control method under different epidemiological conditions." A programme of exchange of information on trachoma was arranged, this including

Debré, R. (ed.) (1955) *Poliomyelitis*. Geneva (World Health Organization Monograph Series No. 26).

Freyche, M. J., Payne, A. M. M., & Lederrey, C. (1955) *Bull. Wild Dis. Org.* 1955: 12 (in press).

¹⁰ See *Chron. Wild Dis. Org.* 1954: 8: 295.

FIG 7 FAO/WHO BRUCELLOSIS CENTRES



against several diseases would permit the pooling of control activities and reduce costs and might contribute to the formation of a realistic public health programme

Veterinary public health and zoonoses

A study on *Brucella melitensis* infection in sheep and goats, initiated in 1953 by FAO with the technical collaboration of WHO, has yielded new and important information which will undoubtedly change certain basic control procedures previously practised. Vaccine trials were begun towards the end of 1954. It is expected that these studies will be continued for several years.

As has been mentioned (page 105) a training course in laboratory methods in the diagnosis of brucellosis was held in March 1954 in Mexico, for physicians, veterinarians, and bacteriologists from the Caribbean region, from Central America, and from Mexico.

The year saw the publication of a much needed monograph on laboratory techniques

in rabies,⁷ of the second report of the Expert Committee on Rabies⁸ and of a complete number of the *Bulletin*⁹ devoted to this disease. Among the papers in the *Bulletin* were reports on results to date of the field demonstrations in rabies control in Israel and Malaya, in which WHO assisted in former years.

The Organization continued to co-ordinate research on rabies including studies on the efficacy of serum and vaccines in prophylaxis, the local treatment of wounds, and the immunity conferred by different rabies vaccines in animals. Works was begun on the preparation of a provisional international standard hyperimmune serum against rabies, and preliminary steps were taken to determine the possibility of establishing an international standard vaccine to serve as a basis of comparison in tests with locally produced vaccines.

World Health Organization (1954) *Laboratory techniques in rabies*. Geneva: (WHO) Health Organization. Monograph Series No. 233.

WHO Health Organization Technical Report Series, 1954, 82.

Bull. WHO Health Organization 1954, 10: 703-866.

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¹¹ Freyche, M. J., Payne, A. M. M., & Lederrey, C. (1955) *Bull. World Health Org.* 1955, 12 (in press).

trachomatologists from Egypt, Iran, Japan, Morocco (French Zone), and Tunisia

A pilot project in trachoma control in Taiwan is being extended to include the treatment of all schoolchildren, and a survey was made in preparation for this work in 1954. The pilot project in Morocco (French Zone) was successful in preventing the annual epidemic of seasonal conjunctivitis (see page 107). New pilot projects were started in Egypt, Tunisia, and Yugoslavia, and surveys or plans were made for control efforts in India, Indonesia, and Spain.

Other communicable diseases

Onchocerciasis An expert committee on this subject met during the year, and a conference on African onchocerciasis was held (see page 104).

Leprosy Activities in leprosy control are increasing in a number of countries, with projects being planned in Indonesia, Iraq, and the Philippines, started in Ceylon and Nigeria, and continued in Burma (after the withdrawal of WHO aid). In addition, a survey was made in Paraguay by the Pan American Sanitary Bureau.

Plague and cholera WHO assisted with a programme of co-ordination of research on the control of wild rodent plague in a number of countries of the Middle East. A meeting was held in Teheran at which specialists representing the Governments of Iran, Iraq, Syria, and Turkey exchanged information on the epidemiological conditions prevailing in their countries and planned co-ordinated control campaigns. An important monograph on plague¹³ was published during the year,

and the first chapters of a monograph on cholera were published in the *Bulletin*¹⁴.

Bilharziasis The year's work on bilharziasis was concentrated on stimulating ecological research on the snail vector and encouraging field studies in the application of the newer molluscocides. Campaigns were continued in

FIG. 8. BILHARZIASIS CONTROL IN THE PHILIPPINES



A snail trap is lifted from an irrigation canal

Egypt, the Philippines, and Syria, and a survey was made in the Sudan. A study group on snail identification and classification met in Paris; its report on African snail vectors was published in the *Technical Report Series*¹⁵.

¹³ Pollitzer R. (1954) *Plague*. Geneva: World Health Organization Monograph Series No. 4.

¹⁴ B. H. Wild. *WHO Wkly Rep* 1954; 10: 421-461.
¹⁵ Wild H. *WHO Wkly Rep Ser* 1954; 90.

PUBLIC HEALTH SERVICES

One of the principal aims of WHO is to strengthen national health services. Three of the methods of approach used to further this aim are (1) field projects on a single health problem, such as control of a specific disease with the idea of using the demonstration to aid in developing general health services into which the specific project may eventually be integrated (2) demonstrations usually in rural areas of integrated health services that can be extended to cover the whole country and (3) stimulation by various means of the initiative of individuals communities or professional groups in developing their own health services

Nutrition

WHO's work in nutrition is concentrated largely on the prevention of protein malnutrition which is the chief nutritional problem in many countries. In 1954 the Organization continued to stimulate and co-ordinate activities on this problem and to assist centres engaged in the study of plant proteins in relation to their use for the young child. It also took a first step in a programme for preventing protein malnutrition by improved education in nutrition: a sociologist was sent to a country in South East Asia to inquire into living conditions of people among whom this type of malnutrition is common although the people are not in the poorest economic circumstances.

During the year WHO made a further study of the prevalence and prevention of pellagra. Consultants were sent by the regional offices to countries in the European and Eastern Mediterranean Regions and to Basutoland and Southern Rhodesia. A consultant on the

FIG 9 NUTRITION IN INDIA



A student at a maternal and child health centre in India gives instruction in simple nutrition to mothers who have brought their children for their daily ration of milk

chemical and engineering aspects of salt iodization visited countries in Latin America to advise on the development of plans to control endemic goitre.

Mental health

As in previous years international seminars were a particularly successful part of the Organization's mental health programme in 1954. A third seminar on alcoholism was held in the Netherlands; a regional study group on the relationship between paediatrics and child psychiatry in the work of children's hospitals met in Stockholm; and a second meeting of the Study Group on the Psychological Development of Child was held.

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¹² Pol. 146 R. (1954) *Plague*. Geneva (World Health Organization Monograph Series No. 20).

Bull. W.H.O. 1954 10 4, 1-461
W.H.O. Tech. Rep. Ser. 1954 90

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FIG 11 NURSES
TRAINING IN
BRUNEI



Practice in a ward

for the first time to five others. Students in Cambodia Nepal and North Borneo had their first opportunity to enrol in recognized nursing courses in their own country. The Organization provided nine countries with nurse midwives to organize and give basic courses of midwifery training and continued to help with the first courses for public health nurses in Indonesia, Malaya and Thailand.

WHO-assisted training programmes prepare auxiliary workers as well as nurses midwives and nurse instructors. Courses are being adapted to the needs of individual countries in one WHO and is being given in training the "health visitor" who after a one year course is able to give instruction on health matters in another longer courses which include more instruction in nursing and midwifery are being given to "community health visitors". For nursing education of a more advanced type courses at a college level are being made possible in some countries. A Regional College of Nursing has been established in association with the University of Alexandria to serve the Eastern Mediterranean Region and in the Western Pacific WHO is helping to establish a university

course for nurses at the National Taiwan University.

Two seminars on nursing were held during 1954 one for midwives in Lebanon, and the other for nurses in Istanbul.

The Annual Report calls attention to certain important developments in nursing education and services.

"In the national nursing programmes with which WHO is assisting, certain trends are noticeable of which the following are the most significant: long term programmes are being planned more carefully; there is a greater readiness to experiment in methods and techniques in order to find those that are most suitable to the particular situation; the close interdependence of nursing education and nursing service is being recognized more fully and, finally auxiliary personnel are being more widely accepted as members of the health team."

Health education of the public

In 1954 WHO assisted twenty five governments in planning and developing local and national health education services as an integral part of health programmes. This assistance took the form of assigning personnel to demonstration and training programmes and of co-operating with Member

Assistance to individual countries was continued. Short term consultants visited Iran, Iraq and Malaya. A child psychologist was recruited for the Child Mental Hygiene Unit in Bangkok, Thailand, and teachers in psychiatric nursing and in electro-physiology and neurology were recruited for the All India Institute of Mental Health in Bangalore, India. A mental health programme was begun in the Eastern Mediterranean Region (see page 108).

Maternal and child health

"Shortage of trained personnel and administrators is one of the main handicaps to the development of public health and medical services to meet the special needs of mothers and children. Assistance from WHO in collaboration with UNICEF has therefore been directed mainly towards helping governments to develop their training programmes for both professional and auxiliary personnel. During the year UNICEF/WHO teams were provided to work with national counterpart staff in demonstration and training projects in Ceylon, India, Jordan, Libya, and Turkey. Similar assistance was continued in twenty other demonstration and training centres in sixteen countries. In seven of them the teams were withdrawn after they had completed their assignments and the national staff assumed full responsibility for the programme."

Comprehensive programmes for co-ordinating and expanding health services for mothers and children and for improving the basic training of workers in this field were initiated in a number of states of India, with

WHO and UNICEF assistance. Also with aid from these two agencies the Government of India is expanding the maternal and child health department at the All India Institute of Hygiene and Public Health in Calcutta, to provide post graduate training.

A study of paediatric education, sponsored jointly by WHO and the International Paediatric Association was continued during the year in most of the countries of Europe and was extended to cover Australia and New Zealand.

Special attention was again given to school health programmes and services. A European conference on school health services was held. In a number of countries (Burma, Cambodia, Hong Kong, India, Indonesia, Libya, Pakistan and Taiwan) particular efforts are being made by



A nurse midwife and a student midwife from a maternal and child health centre in Thailand give post natal care after a difficult confinement

the national health administrations to promote health programmes for school age children as part of general child health services.

WHO continued to help several countries in developing services for handicapped children. (For an account of the project for the rehabilitation of crippled children in Israel see page 124.) Consultants were sent to Austria, Greece, Italy, and Japan.

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FIG 10 MATERNAL AND CHILD HEALTH IN THAILAND



A nurse and a student nurse from a maternal and child health centre in Thailand give post-natal care after a difficult confinement

the national health administrations to promote health programmes for school-age children as part of general child health services.

WHO continued to help several countries in developing services for handicapped children. (For an account of the project for the rehabilitation of crippled children in Israel, see page 124.) Consultants were sent to Austria, Greece, Italy and Japan.

Nursing

In 1954 WHO assistance was continued in seventeen schools of nursing and was given



FIG 12 REHABILITATION OF PHYSICALLY HANDICAPPED CHILDREN IN GREECE

A WHO physiotherapist works with a patient at a school for hand capped children in Athens run by the Hellenic Society

of the disease in succeeding years. These outbreaks were characterized by an abnormally high incidence of cases among children under one year of age and by a very high percentage of residual paralysis. The total number of cases of paralysis was estimated at some 1500 by the end of 1953. In addition there was a considerable influx of post poliomyelitis cases among immigrants.

"To deal with this serious problem Israel had only approximately twenty trained physiotherapists and an inadequate number of unqualified workers trained only by apprenticeship. There was no school of physiotherapy.

In May 1951 the Government asked WHO for assistance in establishing a rehabilitation centre for physically handicapped children and a national school of physiotherapy. In 1953 WHO provided a physiotherapist. Equipment, including raw materials for the manufacture of prosthetic appliances was supplied by UNICEF (Israel 8). The National School of Physiotherapists was opened in December 1953 at the Government Hospital in Sarafand, with seventeen students and a three year course was started in accordance with the specifications of the World Confederation for Physical Therapy.

The project developed along lines which had not been foreseen but which were dictated and justified by circumstances. The number of trained physiotherapists was so very small in relation to the large number of paralysed children that it was found equally impossible to keep the children indefinitely in hospital, to deal with them as out patients in

hospitals (because of difficulties of transport) to open physiotherapy clinics in outlying districts or to arrange for domiciliary treatment. The solution adopted was a scheme of simplified and standardized treatment to be carried out at home by the parents under the supervision of public health nurses who receive special training for that purpose.

Another interesting development was the extension of the training to include the care of rheumatic cases, chronic nervous diseases, surgical cases and pre natal and post natal cases as well as the rehabilitation of the aged.

The rehabilitation centre also in Sarafand, was slower in developing but the buildings are now completed, and comprise a fully equipped gymnasium, a hydro-therapeutic unit, and an occupational therapy department. Two wards opened in July took in forty-one post poliomyelitis cases while the out patient department is dealing with both post poliomyelitis and other orthopaedic surgical cases.

"The orthopaedic workshop is to be developed to supply and modify all the appliances required."

Dental health

WHO began to be actively interested in dental health in 1954. A consultant group was convened to review the main dental health problems and to advise the Director General on the lines along which a WHO programme might be developed.

States in special health education efforts. The importance of cultural factors in health education was taken into consideration: three full-time cultural anthropologists contacted to assist health administrations and health workers with field studies, training projects, and the planning of educational aspects of health programmes.

Largely as a result of interest aroused by regional conferences on health education (e.g., in Mexico and in the United Kingdom in 1953) national seminars on the subject were organized in six countries.

The Organization co-operated with the Government of India in preparing courses on health education at the All-India Institute of Hygiene and Public Health. WHO's assistance in health education at the University of Malaya Singapore ended in July 1954 but the work is being continued under the guidance of a trained worker appointed by the Government. A consultant assisted in a health education training course for public health officers at the School of Public Health in Turkey.

Health education activities were part of WHO's work with the Palestine refugees: groups of refugees are receiving training in courses which have proved to be very satisfactory.

Social and occupational health

To meet more adequately the needs of the wide range of subjects included under the heading of social and occupational health, the WHO expert advisory panel on this subject was replaced during 1954 by four panels: one on the organization of medical care, one on occupational health, one on chronic degenerative diseases, and one on rehabilitation. The immediate concern of the first is hospital planning and administration, of the second the hygiene of seafarers, of the third, rheumatic and cardiovascular diseases, and of the fourth, prosthetics.

WHO continued its assistance to certain governments on various aspects of social planning and administration—e.g., a project for reorganizing medical care management in Ceylon, and a project in Turkey on hospital construction and administration. A monograph *L'hôpital rural*¹¹ was published in French; an English edition is in preparation.

WHO's work in occupational health has two main concerns: stimulating the interest of national administrations and the medical profession in problems of occupational health, and training personnel for industrial health services. For the latter purpose, occupational health institutes are being established in various parts of the world, starting with Egypt, Indonesia, and India.

A professor in industrial hygiene and physiology whom the Organization provided for the All India Institute of Hygiene and Public Health in Calcutta finished his assignment during the year. His work laid the foundations for a permanent centre for teaching and research.

A report on the development of occupational health services was completed by a WHO consultant.

At the request of the Executive Board, the Organization started a study of measures for protecting workers and the general population against X rays and radiation from radioactive isotopes. Member States were asked for information on relevant national legislation and regulations.

Aid in rehabilitation activities was continued. A consultant group on prosthetics was convened. In the field, the Organization assisted in projects for physically disabled adults and children in Greece, India, Israel, Italy, and Japan. The programme in Israel is one illustration of how WHO helps in work of this kind.

¹¹ In 1951 Israel suffered from a severe epidemic of poliomyelitis which was followed by recrudescence.

Bridgman, R. F. (1954) *L'hôpital rural*, Genève (Orydon Mondiale de la Santé. Série de Monographies N° 11).



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Dental health

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The importance of qualified personnel in promoting environmental sanitation work is shown in the Annual Report

The role that trained and experienced people can play in improving environmental sanitation in countries is illustrated by the great influence that even a single consultant has been shown to have on national programmes. This influence has been particularly apparent in Burma, Ceylon, and Indonesia where the Governments on the basis of recommendations of an adviser from Headquarters, are starting in 1955 large projects for the organization of sanitation services and programmes for sanitation work. WHO is assisting with similar programmes in North Borneo and Taiwan—also resulting from the advice of consultants.

The Organization is preparing manuals on sanitation problems such as rural water supply excreta disposal in rural areas and refuse disposal including the production and use of compost.

During the year a world wide survey of current practices in the sanitary examination of water and of standards of drinking water quality was continued. Information provided by seventy one countries has been collected analysed and distributed through the regional offices for discussion by regional groups. Work on milk sanitation went forward the

Organization collaborating with FAO and UNICEF in solving relevant problems such as advising on milk legislation which will be suitable for countries in different stages of "milk technology".

Studies on vector control have dealt with many problems specifically the resistance of lice to DDT and other insecticides the toxicity of insecticides to man and the effects of tropical storage on the physical characteristics of insecticide formulations. It has already been shown that there are resistant strains of lice in Egypt Ethiopia and South Africa. The Expert Committee on Insecticides at its fifth session held during the year at Caracas Venezuela for the first time included in its report specifications for a body dusting powder to be used against lice which are resistant to chlorinated hydrocarbons.

The Organization's ultimate aim in its environmental sanitation programme is expressed thus in the Report:

"In the future it is expected that WHO will be able greatly to advance its aims by continuing to assist governments to plan and develop effective services in urban and rural sanitation and to integrate these services into their expanding health organization."

EDUCATION AND TRAINING

The two main aspects of WHO's work in education and training are "assistance to countries in solving their own training problems and promotion of certain principles in education which have emerged from international studies or are favoured by recent trends and experience". The chief components of its programme in this domain are the award of fellowships the exchange of information and the provision of visiting teaching personnel teaching supplies and advice.

In some instances WHO supports institutions or training courses which are organized

or maintained by several countries such as a regional college for advanced nursing education in Egypt, the Inter American Centre of Biostatistics in Chile and public health training courses for the Scandinavian countries. Assistance is given in international courses on child health statistics environmental sanitation anaesthesiology nursing and health education among other subjects. Another useful type of activity is the sponsorship of seminars and conferences.

The Organization is undertaking an analysis of medical education on a regional basis with suggestions for future develop-

A dental health seminar was organized by the Organization in New Zealand, this seminar was attended by thirty seven participants from three of the WHO regions

Health work among the Palestine refugees

The Seventh World Health Assembly extended the 1950 agreement with the United Nations Relief and Works Agency for Palestine Refugees in the Near East to 30 June 1955. Accordingly, the Organization has continued to plan and direct health activities among the refugees. In 1954 a health educator was added to the staff already serving in the camps—i.e. a full time medical officer, a malariologist, a public health engineer and consultants.

The general health of the refugees remained good throughout the year and the nutritional level was substantially the same as in 1953. As in the past, immunizations

were given and antimalaria operations were continued. Considerable progress was made in sanitary improvements and in adding to hospital facilities. Nine new clinics were added making a total of ninety to serve the refugees with more than two thousand hospital beds available for treatment.

A school health service was started at the beginning of the 1954-55 scholastic year. Six health teams are proportionately distributed throughout the various countries to care for the 110 000 refugee children being educated in the Agency's schools.

The training of selected refugees as auxiliary medical workers was continued. Courses were conducted for nurses (general, public health, mental health and tuberculosis), malaria inspectors, laboratory technicians, assistant pharmacists, sanitary inspectors, medical orderlies, and midwives, a total of 204 refugees receiving training during the year.

ENVIRONMENTAL SANITATION

In 1954 WHO continued to give advisory services on environmental sanitation to countries and to make improvement of sanitary conditions "an integral part of its work on other more specialized public health problems particularly in the control of communicable diseases and the organization of public health services." Member States were urged to give prominence to sanitation in their health programmes.

Among the general problems to be dealt with are:

"(1) the disposal of sewage, excreta and refuse in a safe and practical manner both from communities and, more pressingly from rural households; (2) the development of supplies of safe and suitable drinking-water; (3) the supply of uncontaminated milk and other food, which involves suitable provisions for cleanliness in processing, storing, handling,

preparing and serving; (4) vector control, including the specification, handling and use of insecticides, rodenticides and molluscocides and the equipment or methods for their application; (5) the health aspects of housing and town and country planning; and (6) the protection of industrial workers and the general public from atmospheric pollution or unhealthy industrial environment."

Efforts are hampered by a scarcity of qualified personnel in sanitation and stress is therefore being laid on the training of sanitary engineers and other workers. For example, two instructors are being recruited to organize courses in sanitary engineering in Egypt and India. Seminars on sanitary engineering were held in Central and South America during 1954 and WHO is helping to extend the teaching of sanitation in medical schools.

the training of auxiliary personnel and in sanitation) two in India (in maternal and child health and social medicine) and one in Indonesia (in paediatrics)

Information was collected for a second

edition of the *World Directory of Medical Schools* and inventories of apparatus and materials for the undergraduate teaching of certain of the basic medical sciences were prepared for publication by UNESCO

SERVICES IN EPIDEMIOLOGY AND HEALTH STATISTICS

International Sanitary Regulations

The second year of application of the International Sanitary Regulations was completed on 1 October 1954. The position with regard to acceptance of the Regulations and to their functioning appears to be satisfactory. The Annual Report describes the situation thus:

"Health administrations seem to be finding that, except for the provisions relating to yellow fever the Regulations are fitting without great difficulty into their quarantine organizations, and that most of the problems that arise are being satisfactorily settled on a national basis by change in legislation, or when a problem touches more than one country by negotiation and discussion leading to an agreement between the countries concerned."

The Seventh World Health Assembly following examination of the first report of the Committee on International Quarantine took a number of decisions and made recommendations which will solve many of the difficulties which have been experienced in the application of the Regulations. A second meeting of the Committee took place towards the end of 1954 and among other problems the yellow fever provisions of the Regulations were discussed. A draft text to replace the existing provisions will be submitted to the Eighth World Health Assembly which will consider these and other recommendations of the Committee.

As the Annual Report states "There is good reason to hope that the International Sanitary Regulations will eventually operate on a truly world wide basis."

Epidemiological and statistical information

The Organization constantly reviews its epidemiological services and introduces changes, as necessary to improve their efficiency in disseminating information. However much depends on national health administrations which must regularly send the needed information to WHO. There has been an improvement in the regularity of the returns and reports sent to the Organization but the position is not yet entirely satisfactory.

Epidemiological radio bulletins are broadcast daily from Geneva (on eight wave lengths in English and two in French) weekly from Singapore twice weekly from Alexandria, and daily over a wide network reaching the Indian Ocean and the Western Pacific. The new epidemiological cable code (CODEPID) which is designed to ensure reliable safe and economical telegraphic transmission of official notifications came into general use on 1 January 1954.

The Organization's statistical services have continued to advise governments, assist in training programmes, and provide counsel for technical units at Headquarters, regional offices and field consultants. The *Weekly Epidemiological Record* and the *Epidemiological and Vital Statistics Report* have appeared regularly and two volumes of the *Annual Epidemiological and Vital Statistics* for 1950 and 1951 were published during the year.

ments. Such a study has been made for South East Asia,¹⁷ and this is being followed by analyses and recommendations for individual countries in the Region.

Fellowships

Since the inception of the fellowships programme in 1947 WHO has awarded 4416 fellowships. 667 of these were awarded in 1954. A high proportion of the fellows were placed in their own region in 1954—68% of the total. This has the double advantage of saving travel expenditure and of enabling fellows to study under conditions similar to those in their own countries, making adaptation of the acquired knowledge to the home environment easier. A number of fellowships were awarded for group training programmes (courses etc.) organized or assisted by WHO—22% of the total.

In 1954 WHO fellows studied in seventy-two countries, about four fifths of them being placed in the United Kingdom of Great Britain and Northern Ireland, France, the USA, Sweden, Netherlands, Denmark, Chile, Switzerland, Egypt, Norway, India, Turkey, Italy, Federal Republic of Germany, Finland, Lebanon and Canada. Most of the fellowships were granted for studies in public health organization and allied services: public health administration 17%, sanitation 7%, nursing 7%, maternal and child health 7%, and other more specialized health services 16%. Control of communicable diseases accounted for 33%: the remainder were in medical education, basic medical sciences and various aspects of clinical medicine.

Exchange of scientific information

"The exchange of scientific information is a prominent feature of virtually all the technical activities of WHO. It naturally develops whenever the Organization establishes international scientific contacts

in the course of its routine functions, but it is more actively promoted by specifically designed projects such as the various kinds of scientific meetings being organized on an increasing number of subjects. The primary purpose of exchanging scientific information may differ in particular instances: sometimes such exchange may aim at increasing the available body of scientific knowledge, sometimes it may aim at specific improvements in public health practice and the care of the sick; again it may serve as an essential feature of medical education aimed at improving the standards of academic teaching staffs.

Among the specific projects in which the Organization assisted in 1954 was an exchange of research workers on trachoma (see page 119), on research on cancer of the liver in Africa, being conducted concurrently but independently at the Institut des Hautes Etudes de Dakar and at the University of Witwatersrand, Johannesburg, and on relapsing fever, spirochaetes, a co-operative undertaking of the Institut Pasteur of Tunis and Addis Ababa. WHO also initiated the establishment of a microfilm reference service for the Eastern Mediterranean Region in the library of the American University of Beirut and gave support to, or co-operated with, various international congresses of medical sciences.

Assistance to educational institutions

Although it is difficult to recruit suitable professors for short time assignments in other countries, WHO is drawing up a roster of persons who are both well qualified and prepared to accept posts outside their own countries. In this task the Organization is maintaining liaison with UNESCO, each putting its lists of potential candidates at the disposal of the other.

During 1954 about thirty teachers provided by WHO were working in medical training institutions in many countries. Seven of them began duty during the year: one in Afghanistan (in physiology), one in Burma (in the training of auxiliary personnel), two in Ethiopia (in

¹⁷ See *Ch on Wld Hlth Org* 1954 # 98

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OTHER ACTIVITIES AND DEVELOPMENTS

The double task of providing new standards for therapeutic and other biological substances and of replacing those that are nearing depletion proceeded uninterruptedly during the year

International Shigella Centres were established by WHO in Atlanta, Ga, USA, and in London

The Spanish edition of the *Pharmacopoea Internationalis* was published in 1954 and sent to governments of Spanish speaking countries

An important development with regard to addiction producing drugs was the decision taken concerning interpretation of the term convertible in so far as WHO's responsibilities are concerned it was decided by the Seventh World Health Assembly that WHO would consider a substance as convertible where the ease of conversion and the yield obtained constitute a risk to public health, and that in cases where there was uncertainty as to whether a substance would fall under this definition the substance would also be considered as convertible rather than as not convertible

Purchases of medical and other supplies and equipment for WHO projects financed

from the regular budget and from Technical Assistance funds amounted to US \$420 000 for the year 1 October 1953 to 30 September 1954

By the end of 1954, twenty titles had been published in the *Monograph Series*

On World Health Day in 1954 the BBC televised a sixty minute documentary feature programme entitled *World Nurse*, which was estimated to have been seen by approximately four million people in the United Kingdom

The Regional Committee for Europe selected, and the Executive Board approved Copenhagen as permanent site of the Regional Office for Europe

In December 1954 the Organization prepared to take part in an international conference on the peaceful uses of atomic energy which is being sponsored by the United Nations. A consultant group of four experts was convened to advise WHO on the role it could play in this domain, supplying the Director General with a report on the health hazards of atomic energy and on the potential uses of radioactive isotopes in medicine and public health

POLIOMYELITIS

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PARTIE I — MOUVEMENT DE LA POPULATION
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PARTIE II — CAS ET DÉCÈS DUS AUX MALADIES
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PART II — CASES OF AND DEATHS FROM NOTIFIABLE DISEASES



ORGANISATION MONDIALE DE LA SANTÉ
WORLD HEALTH ORGANIZATION

PALAIS DES NATIONS

GENÈVE

1955



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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SCHEDULE OF MEETINGS

14 April 5 May	Training Course in Recent Techniques in Management of Poliomyelitis Patients, Copenhagen
2 7 May	Meeting on Classification of Diseases and Problems of Medical Certification in America Caracas
9 May 20 June	International Tuberculosis Training Centre, Istanbul Training Course for Physicians
10 May	Eighth World Health Assembly Mexico City Executive Board sixteenth session Mexico City (following closure of the Health Assembly)
9 28 May	Training Course in Occupational Health Paris
16 May 27 June	Training Course in Insect Control, Rome and Latina
6-10 June	Advisory Group on Veterinary Public Health Geneva
9 22 June	Third Inter American Statistical Conference Rio de Janeiro

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INTERNATIONAL CO OPERATION IN THE DEVELOPMENT OF PEACEFUL USES OF ATOMIC ENERGY

The development of peaceful uses of atomic energy was given new impetus in December 1954 when the General Assembly of the United Nations adopted a resolution promoting international co-operation in this domain. The General Assembly expressed the belief that "the benefits arising from the momentous discovery of atomic energy should be placed at the service of mankind" to ameliorate living conditions, to assist in "lifting the burdens of hunger, poverty and disease." It encouraged the early establishment of an international atomic energy agency and authorized the convening of an international technical conference on atomic energy.

A committee of representatives of seven governments was set up to advise the Secretary General of the United Nations on preparations for the conference. In an opening statement to this advisory committee which met in January 1955, the Secretary General emphasized the importance of atomic energy for technical progress and of the sharing by all of the results of its practical application to the peaceful needs of man. The discovery of atomic energy, he said, was the result of highly specialized research in the most technically advanced countries. But he pointed out atomic energy is a property of nature itself and as such it belongs to all peoples.

WHO has for some time been aware of its new responsibilities with regard to atomic energy in relation to medicine and public health. On the suggestion of the Government of Austria, the WHO Executive

Board at its thirteenth session requested the Director General to study the subject of international regulations for the protection of workers and the general public against roentgen and isotopic radiations. This study is being made in consultation with the international organizations concerned and with Member States.

With the passing of the aforementioned resolution by the United Nations General Assembly and an invitation to WHO to participate in the technical conference, the interest of the Organization in the broader medical and public health aspects of atomic energy became a matter for urgent action. Accordingly, the Director General convened, in mid-December 1954, a consultant group on atomic energy.¹ This group of four consultants—three of them heads of medicobiological departments in national atomic energy commissions or similar bodies and the fourth a physicist with special knowledge of the biological aspects of radiation—supplied the Director General with information on present and future possibilities for the use of atomic energy in medicine and on problems of health protection against radiation and suggested the role of WHO in relation to the future developments which might be expected. The report of the consultant group served as the basis for a preliminary note on the peaceful uses of atomic energy in medicine and public health which the Director General submitted to the advisory committee through the Secretary General of the United Nations.

At its fifteenth session in January February 1955, the WHO Executive Board discussed the Organization's part in helping to promote international co-operation in the medical uses of atomic energy and recognized that new scientific developments in this field would undoubtedly deeply influence the programme of work of the Organization. It endorsed the preliminary action taken by the Director General and authorized further action with regard to participation in the conference and co-operation with, and assistance to an international atomic energy agency, should such an agency be established.

Thus the ground has been prepared for co-operation on an international scale in the promotion of the development of peaceful uses of atomic energy, the discovery of which has ushered in what has been termed a second industrial revolution. Of immediate concern is the international conference on atomic energy, which is to take place in Geneva in August 1955. WHO is preparing its participation in the conference in liaison with the other United Nations specialized agencies, all of which have been invited to take part. The purpose of the conference and the high hopes with which it is being

planned have been given eloquent expression by the Secretary General of the United Nations in his opening statement to the advisory committee on its preparation.

There have been many international conferences on pure and applied nuclear science in recent years that have contributed to a sharing of knowledge in this field. But this conference is conceived as something different in kind and of very special significance. It is the first world-wide conference of governments in this field. Secondly its results should—in the words of the Assembly resolution—facilitate the use by the entire world of atomic energy for peaceful purposes. I emphasize the word use. Its proceedings should be primarily concerned with the practical application of atomic energy for power and other purposes.

Of the more than eighty countries which are invited to the conference, relatively few have as yet been in a position to share in the development of atomic energy or to benefit from the knowledge and skills of scientists and engineers trained in nuclear techniques. Thus the coming conference can have a most important role to play in promoting that sharing of knowledge and ideas which is so necessary if the promise of atomic energy for the benefit of mankind is to be realized.

For all I hope it will add strength to a spirit of co-operation transcending all that now so obviously divides the world in the interest of that higher unity—mankind itself."

Arrangements for Yellow Fever Vaccination

The International Sanitary Regulations specify that an international certificate of vaccination against yellow fever is valid only if the vaccine used has been approved by WHO and if the vaccinating centre has been designated by the health administration for the territory in which that centre is situated. A recent supplement to the *Weekly Epidemiological Record** gives information concerning arrangements for vaccination against yellow fever, summarizing the situation as on 11 February 1955. Following a statement showing the position of countries and territories under the International Sanitary Regulations, there are listed the centres designated by health administrations for the issue of international certificates of vaccination against yellow fever, the institutes manufacturing yellow fever vaccines approved by WHO and yellow fever vaccine testing stations.

* *Wkly epidem Rec* 1955 No 6 Supp.

ASSISTANCE TO EDUCATIONAL INSTITUTIONS

Early in its history the World Health Organization recognized that a basic attack on the health problems of mankind could be launched only if there were adequate numbers of trained personnel available for this gigantic task. The Organization has therefore undertaken to encourage governments to establish and develop national educational institutes for health workers such as doctors, nurses, sanitarians and others.

WHO has not sponsored the establishment of medical schools and colleges but it has promoted surveys of professional education which, through long range plans, may lead to the construction of new institutions. However, with respect to the development of existing teaching facilities, the Organization provides assistance in both material and personnel, the latter in the form of visiting professors.

Visiting professors

Educational institutions, through their governments, are impelled to ask WHO for assignment of visiting teachers under a variety of circumstances and for a number of reasons prominent among which are (a) political and economic changes resulting in a sudden shortage of senior teaching personnel, (b) recognition of the necessity for creating full time professorships in place of part time teaching positions, especially in the pre-clinical subjects, (c) creation of a professorship in a subject not previously taught (this is so chiefly with respect to preventive and social medicine) and (d) the need for assimilation of the latest technical knowledge in a particular subject into the relevant teaching department.

The growth of this type of assistance may be noted in the figures below which show

the number of teaching assignments sponsored by WHO in the years 1952, 1953 and 1954 and the number of months spent in these assignments by the respective professors.

Year	Number of teaching assignments	Number of person-months
1952	10	54
1953	22	177
1954	38	284
Total	70	515

These 70 teaching assignments were actually carried out by 40 different individuals, most of them at varying intervals over the end of the calendar year.

The underlying purpose of the assignment of a visiting professor is to help an institution develop its own teaching staff. In each case, therefore, a counterpart teacher of the local faculty is designated to work with the WHO expert and usually succeeds the latter at the end of his stay. As the preparation of a professor is a lengthy process, often involving, among other things, a fellowship for foreign study, one of the problems facing WHO is a determination of the timing of various phases in individual projects. This in turn leads to the stimulation of long range planning for institutions' development, including creation and financing of positions by the local authorities, the award of fellowships by WHO or other organizations or agencies, and the assignment of visiting professors.

Although the needs of educational institutions (especially in "underdeveloped" countries) have been known in general terms, a complete analysis has not been possible up to the present time. However, a listing by subjects of the assignments of visiting teachers from 1952 to 1954 gives some idea of these needs. Table I shows that the greatest deficiencies in medical schools are in the

At its fifteenth session in January February 1955, the WHO Executive Board discussed the Organization's part in helping to promote international co-operation in the medical uses of atomic energy and recognized that new scientific developments in this field would undoubtedly 'deeply influence the programme of work of the Organization. It endorsed the preliminary action taken by the Director General and authorized further action with regard to participation in the conference and co-operation with and assistance to an international atomic energy agency, should such an agency be established.

Thus the ground has been prepared for co-operation on an international scale in the promotion of the development of peaceful uses of atomic energy, the discovery of which has ushered in what has been termed a second industrial revolution. Of immediate concern is the international conference on atomic energy, which is to take place in Geneva in August 1955. WHO is preparing its participation in the conference in liaison with the other United Nations specialized agencies, all of which have been invited to take part. The purpose of the conference and the high hopes with which it is being

planned have been given eloquent expression by the Secretary General of the United Nations in his opening statement to the advisory committee on its preparation.

"There have been many international conferences on pure and applied nuclear science in recent years that have contributed to a sharing of knowledge in this field. But this conference is conceived as something different in kind and of very special significance. It is the first world-wide conference of governments in this field. Secondly its results should—in the words of the Assembly resolution—facilitate the use by the entire world of atomic energy for peaceful purposes. I emphasize the word use. Its proceedings should be primarily concerned with the practical application of atomic energy for power and other purposes.

"Of the more than eighty countries which are invited to the conference, relatively few have as yet been in a position to share in the development of atomic energy or to benefit from the knowledge and skills of scientists and engineers trained in nuclear techniques. Thus the coming conference can have a most important role to play in promoting that sharing of knowledge and ideas which is so necessary if the promise of atomic energy for the benefit of mankind is to be realized.

For all I hope it will add strength to a spirit of co-operation transcending all that now so obviously divides the world in the interest of that higher unity—mankind itself."

Arrangements for Yellow Fever Vaccination

The International Sanitary Regulations specify that an international certificate of vaccination against yellow fever is valid only if the vaccine used has been approved by WHO and if the vaccinating centre has been designated by the health administration for the territory in which that centre is situated. A recent supplement to the *Weekly Epidemiological Record** gives information concerning arrangements for vaccination against yellow fever, summarizing the situation as on 11 February 1955. Following a statement showing the position of countries and territories under the International Sanitary Regulations, there are listed the centres designated by health administrations for the issue of international certificates of vaccination against yellow fever, the institutes manufacturing yellow fever vaccines approved by WHO and yellow fever vaccine testing stations.

Wkly epidem Rec 1955 No 6 5 pp 2

ASSISTANCE TO EDUCATIONAL INSTITUTIONS

Early in its history the World Health Organization recognized that a basic attack on the health problems of mankind could be launched only if there were adequate numbers of trained personnel available for this gigantic task. The Organization has therefore undertaken to encourage governments to establish and develop national educational institutes for health workers such as doctors, nurses, sanitarians and others.

WHO has not sponsored the establishment of medical schools and colleges but it has promoted surveys of professional education which, through long range plans, may lead to the construction of new institutions. However, with respect to the development of existing teaching facilities, the Organization provides assistance in both material and personnel, the latter in the form of visiting professors.

Visiting professors

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Curriculum standards

A curriculum is an educational plan and should be an expression of the steps whereby certain stated objectives are approached. It is important that an educational institution should define its goals in terms of the personnel needs of the community. WHO is stimulating wider appreciation of the fact that existing curricula of professional schools should be analysed in the light of acceptable principles and assists institutions to adopt a more realistic policy of education and training.

Although certain minimum world wide standards must be adhered to especially where degrees are offered, it is not reasonable to establish a curriculum which merely copies that offered in another country. Each institution must reflect conditions in, and of the society which it serves. In the formulation of a curriculum many factors should be considered besides the relative importance of the several subjects. Among such factors are the prior preparation of the students, the stage of development of the institution and staff and the capacity of the particular society to absorb advanced concepts.

Teaching methods and qualifications of teachers

The methods by which knowledge is disseminated are often as important in attaining educational goals as the substance itself. WHO studies and promotes the use of teaching techniques most appropriate under varying circumstances such as lectures, seminars, case studies, conferences, unit plan assignments, practical laboratory and bedside work and home visits. As more knowledge of educational psychology and the learning process becomes available, WHO will disseminate this valuable information throughout the academic world.

There is increasing recognition of the fact that neither technical or professional competence nor the performance of research

necessarily means that a person appointed to an academic post is able to communicate knowledge to stimulate students to learn for themselves and to inspire high ideals in the practice of his profession. WHO is attempting, through consultation and advice to promote an awareness of the qualities which should be developed in the future teachers of students in the health professions.

The "wholeness" of educational institutions

The concept of an educational institution as having a unity is growing in acceptance. The idea that a group of professors—of medical subjects for example—each working in splendid isolation will necessarily produce a well rounded integrated doctor is not held to be as axiomatic as it once was. Furthermore the orientation of medical education is now towards the whole person as he lives in his physical, psychological and social environment so that the co operation and co ordination of all departments of the medical school are needed. It is interesting to note that in the methods and techniques by which each institution strives towards this more or less universal goal lie their most striking differences. The individual character of a particular medical school can be reflected as much in its unity and its orientation towards the whole human being as in the calibre of its science courses and the extent of its research programme. WHO is promoting the wider discussion and acceptance of these concepts among medical educators.

The programme of assistance to educational institutions therefore is aimed at development in detail as well as on a broad front. Long range planning must replace haphazard growth, often influenced in one or another direction by an outstanding personality and the relationship of professional training to social and cultural factors must receive ever increasing consideration.

SOME IMPRESSIONS OF A MEMBER OF WHO VISITING MEDICAL TEAMS *

Visiting teams of medical scientists are voluntary projects always initiated by invitation from an official agency of a Member nation usually the Ministry of Health. The host country invites WHO to send representatives in selected specialties to be the guests of the government. If the project is approved WHO selects a travelling faculty of eight to fourteen international members and in collaboration with a local preparatory committee arranges the programming and time schedule of a visit of two weeks to two months duration. The visiting group is assured a cordial welcome by the local medical profession and the public.

Programmes are planned with three general objects in mind to serve as an informal forum for discussion of health conditions, medical needs and problems of medical education in the host country to exchange scientific information and ideas and to encourage friendly relations between visiting and local scientists.

To fulfil these purposes requires a heavy work schedule: formal lectures, clinical and pathological conferences, seminars and round table discussions, laboratory demonstrations, ward rounds, operations and consultations, motion pictures, field trips, social functions and "curbstone" discussions with local colleagues in various specialties, twelve to fourteen hours comprising the average work day.

Up to the end of 1953 WHO and the Unianian Service Committee of the United

States both separately and jointly had sent international faculties to more than 70 universities in 17 foreign countries of South America, Europe and Asia. A total of 175 men served on these visiting teams. They came from 45 American and from 20 non American institutions. I have been on four such teams in Poland and Finland in 1948, the Netherlands and Sweden in 1950, Israel and Iran in 1951 and India in 1953.

I should like to give some reasons based in part on personal experience why I believe that in the non political sphere of health and medicine international co operation among groups of nations is more effective than any bilateral arrangements.

Free choice of a visiting faculty from all countries of the world is the best way to ensure professional competence. No nation has a monopoly on medical advances: insulin was discovered by a Canadian, penicillin by a Scotsman, streptomycin by an American and DDT by a Swiss. Members of the four visiting teams to which I was assigned came from 21 universities in 9 countries. Two Nobel Prize winners in medicine—Dam, of Denmark and Tiselius of Sweden—took part in visiting team activities and two others—Fleming of the United Kingdom, and Heymanns of Belgium—were members of the teams which visited Sweden, Iran and India.

Recognition by the host country of the professional competence of these international faculties was manifested on many occasions. The Government of Israel requested the three public health representatives of the team, one Norwegian and two Americans to act as official advisers on problems of immigration, sanitation, epidemiology

* Address of an address by S. Z. Levine, M.D., Professor of Pediatrics, Cornell University Medical College, and Pediatr. Clin. Ch. N. Y. Hosp. at the 1st meeting of the Massachusetts Medical Society, Boston, 19 May 1954. This address was published in the N. Engl. J. Med. 1954, 251: 312.

and public health administration. The dean of the medical school in Teheran had all the lectures by members of the visiting team translated into the Persian language and published in book form for country wide distribution to the doctors of Iran. The original manuscripts were in four languages.

The fact that WHO is strictly a technical body, free from all political and religious ties and international in its outlook, has gained for it the confidence and respect of nations in the East as well as in the West. Acceptance in the technical field of health of practical effective international co operation on all professional levels is extremely significant when viewed against the difficult political backgrounds of some countries.

The wide acceptance of visiting teams of WHO in academic and governmental circles of its Member nations establishes these projects as a valuable medium of world health promotion as well as a useful educational technique. It reflects the care with which WHO has picked its teams irrespective of origin or country, and the efforts put into preparatory planning, scheduling and day to day operations while the team is in residence in the host country.

The personal contact, the informality of discussions and the recognition by all participants visiting and local that the interchange of scientific information is in a real sense a two way street of education remove the stigma of loss of face, encourage free and frank discussion and can lead to friendly and often lasting relations. People the world over instinctively respond to visitors who treat their people as people and not as

source material for the amassing of data and statistics.

Of no less importance are the benefits that accrue to the visitors themselves. The stimulus of living intimately for two months with foreign colleagues who have similar interests is great. Equally rewarding are the opportunities to talk to people from remote lands, to hear strange tales, to eat unfamiliar foods, to join in unusual social functions, to see exotic diseases and to learn about foreign cultures.

But even more pervasive than specific memories is the over all conviction that all the peoples of the world are essentially alike. Their basic desires are the same: to be healthy, to be free to be respected, to have enough food to eat and enough clothes to wear and to have shelter over their heads. Fulfilment of these basic needs brings hope and faith in its wake, without it there are pain and suffering, insecurity and despair.

In Iran, in India and in other countries Danish doctors are conducting antituberculosis campaigns by mass BCG inoculations, Italian public health workers are helping to eradicate malaria with DDT, Swedish nurses are attending children in hospitals, and American immunologists are vaccinating babies against smallpox, all working together for world health promotion.

The investment in WHO is small indeed when measured against the huge returns of increased productive labour, higher standards of living and world amity. WHO in its global fight against disease is doing its share to bring about world peace in an unobtrusive but highly practical way.

German Translation of International Pharmacopoeia

Volume I of the *Pharmacopoea Internationalis* is now available in German, a translation having been published recently by Wissenschaftliche Verlagsgesellschaft MBH, Stuttgart. This volume was published by the World Health Organization in English and in French in 1951 and in Spanish in 1954.

NOMENCLATURE AND CLASSIFICATION OF HEALTH PERSONNEL*

The scientific and technological advances of the twentieth century have resulted in an increasing dependence on highly trained professional workers—in no domain more than in health. In general there is a positive correlation between the degree of a country's economic development and the level of training of its professional workers.

In countries which are as yet "under developed" partially trained persons are of necessity performing tasks which in more advanced countries would be entrusted only to fully trained workers. This situation should be viewed as temporary as a stage in the development of such countries.

The classification and nomenclature of health personnel and the training which each group should have in order to perform the functions assigned to it pose problems in comparing the various categories of health workers in different countries. The key chart on the next page is an attempt to aid in solving these problems. It presents a classification general enough to avoid interference with any country's existing system of health services yet specific enough to permit of reasonable comparisons. The classification is based on education and training rather than on job description. It places an auxiliary worker¹ at a certain vocational (and incidentally social) level and points the way to

improvement of status through further effort and training, whereas classification by job description would give the worker a temporary and uncertain status subject to alteration by assignment to another type of work. Furthermore from an international viewpoint a job description in one place would perhaps have no comparable meaning in another.

The qualitative scale (horizontal in the key chart) represents some of the standard functions which have been devised for meeting certain human health needs but there may be some overlapping of functional lines. The categories set out in the key chart emphasize the major but not exclusive element in the training of the particular health worker.

In the quantitative scale presented in a vertical direction each unit expresses the minimum length of time which a health worker should spend in preparing for his job. The lines which separate the several levels are in contrast to those between categories solid and enclosed in the sense that there is no easy ebb and flow between them. Although an individual may move from a lower level to a higher there are limitations of function which pertain to each level in each category. The scale is arbitrary but not more so than any numerical grouping. The fact that workers in different columns appear at the same quantitative level does not imply equivalence between them; each column should have the quantitative scale applied to it without comparison with the others.

In the key chart both the expressions "general education" and "technical training" have a broad range of meaning, varying in content, in ratio of theoretical to

* From a article published in *W H J H A Org* 1953 32 413 by Dr J L T. P. n. Chi f Section of Asian ice to Educa to f f unions, WHO Dr Troupas was given tech ical d ice in the prepar tion of the key hart by a mber of other WHO staff members. M as O Baggallay f the N rning Section, M R N Clark f the D sion of E vuro mental Sa ta ion, d Dr J J Orkney of the M al and Child Health Secion. Th rticle is also published, in Spanish in the *Boletín de la OMS* 1953 32 413.

By lary health worker is meant the partly trained or r rly qualified person who performs task which are generally en ru ed f f ly q l f ed, professional workers, or the person, such a laborator or X-ray technician, he comes a Jun profesio al ca egory considered au lary.

KEY CHART
NOMENCLATURE AND CLASSIFICATION OF HEALTH PERSONNEL

	MEDICAL	NURSING	PUBLIC HEALTH ENGINEERING	MIDWIFERY
	Physician			
Secondary education plus six years higher educa- tion and technical training }			Public health engineer	
Secondary education plus four years higher educa- tion and technical training }	Licentiate doctor	Nurse	Sanitarian— health inspector	Midwife
Twelve years general education plus three years technical training }	Medical assistant			
Eight years general education plus two years technical training }	Medical aide	Assistant nurse	Sanitarian— health assistant	Assistant midwife
Six years general educa- tion plus one year a tech- nical training }			Sanitarian— health aide	Midwife aide
Literacy plus six months technical training }	Nursing aide			
Literacy plus three months technical training }	Medical technician	Home helper	Sanitary technician	
Literacy plus two months technical training }				
No formal training	Tribal or village medicine man			Indigenous midwife

practical and in attitudes and methods of learning. The "technical training" must necessarily be different for each functional category though it is important that the compartments should not be watertight. Quantitatively speaking it is understood that the years spent in study are the best though at present a crude measure of extent of education and training.

The nomenclature and classification in this key chart may have some practical application. In countries in which the patterns of training and utilization of auxiliary personnel are already well established the nomenclature here proposed may represent a convenient vocabulary which the health authorities may use in describing their experiences and services to colleagues in other countries and in comparing their experiences with others. Where a pattern of health services has not yet been established

the key chart may be useful in planning the first steps following a study of health conditions, educational status and social and economic factors to determine the health needs of the population and how they can be met. One country for example may decide that it will train a certain number of medical aides each year because the medical attendant at this level would best fit into its social, economic, geographical, educational and administrative pattern. In a number of years in some instances perhaps even in a generation or more the development of the country may warrant a raising of educational and training standards and it might then be decided to discontinue the training of medical aides and to turn the educational institutions over to the training of medical assistants working towards a gradual improvement in training and in the quality of medical services.

Epidemiological and Vital Statistics

A recent number of the *Epidemiological and Vital Statistics Report*¹ contains tables forming part of a series on retrospective data on certain subjects—mainly communicable diseases and causes of death. In this particular number the subject is plague and data are given on cases of plague reported in various countries and territories of the world since 1921, on deaths from plague in certain countries since the beginning of the century and in other countries since 1921, and on cases of and deaths from plague in a number of countries and territories in 1953 and 1954. Also in this *Report* are data on cases of and deaths from, scarlet fever in certain countries and territories in 1953 and 1954.

Another number of the *Epidemiological and Vital Statistics Report*² presents statistics on (1) mortality from tuberculosis of the respiratory system in a number of countries since 1950, (2) deaths from smallpox in certain countries since the beginning of the century and in other countries since 1921, (3) cases of and deaths from, smallpox in various countries in 1953 and 1954, and (4) cases of and deaths from epidemic typhus and other rickettsial diseases in 1953 and 1954.

Epidem. and Statist. Rep. 1955, 8, 1-20.
Epidem. and Statist. Rpt. 1955, 8, 55-80.

CONFERENCE FOR THE SEVENTH REVISION OF THE INTERNATIONAL LISTS OF DISEASES AND CAUSES OF DEATH

For more than a hundred years it has been recognized that a standard statistical classification of disease and injury is essential if statistics of the causes of illness and death are to be comparable. Attempts have been made since 1855 to draw up lists of causes of death for international use. The first such list to be generally adopted was the work of a committee headed by Dr Jacques Bertillon, of Paris, and came into use in 1893. Since that date, six revisions of what are known as the International Lists of Diseases and Causes of Death have been made, under the auspices of the French Government.

In accordance with its constitutional obligations, WHO assumed the responsibility for continuing the revision of the Lists and for establishing a statistical classification of diseases, injuries, and causes of death. At the time of the First World Health Assembly, in 1948, the Sixth Revision of the International Lists of Diseases and Causes of Death had been made and the Health Assembly adopted WHO Regulations No. 1

regarding nomenclature (including the compilation and publication of statistics) with respect to diseases and causes of death, the purpose of which was to ensure as far as possible the uniformity and comparability of statistics of diseases and causes of death through application of the recently revised Lists.

The *Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death*, published by WHO in English, French, and Spanish, contained in addition to the Classification itself, an international form of medical certificate of cause of death and international rules for coding the causes stated on the certificate.

It was thought as well to carry out the Seventh Revision of the International Lists in 1955 so that the revised Manual could be applied in 1958, two or three years before population figures by age and sex are obtained from national censuses, thus making it possible to compute accurate disease specific mortality rates for the period around the census date. Accordingly, WHO convened the International Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death in February 1955. Delegations from the governments of twenty-four countries met at UNESCO House, Paris, under the chairmanship of Professeur Jacques Parisot, to consider in detail the revision of the Manual and other subjects related to the International Classification and its use.

The proposed modifications of the Classification are mostly intended to amplify and clarify the existing provisions, actual changes in the categories being kept to a minimum.

Conference participants agreed that the classification of causes of foetal death required further investigation from both the medical and the statistical points of view, before a substantial revision could be undertaken. It was recommended that certain studies relevant to this problem be undertaken by WHO and that national administrations able to do so undertake the registration of foetal deaths and of their causes, seek to improve the accuracy of the reported causes, and carry out studies on the certification and tabulation of causes of foetal death and on linking them with causes of neonatal mortality.

It was further recommended that no change be introduced in the present International Form of Medical Certificate of

Cause of Death but that information on its use be collected by WHO so that the advisability of improving the present form might be considered. Certain revisions were made in the rules for the selection of cause of death for primary tabulation; these were mainly aimed at removing ambiguities and facilitating application. However the conference recommended that under WHO guidance studies of multiple causes of death should be carried out not only to determine the validity and soundness of the existing rules for classification but also to give information on conditions which do not appear in single-cause tabulation.

It was also stressed that the Organization should aid in the improvement of morbidity statistics though it was felt that the time was not ripe to attempt to formulate specific rules for classification of morbidity statistics or to establish a series of additional international standard lists for their tabulation. This too was a subject which WHO was requested to study further.

Problems encountered in applying WHO Regulations No. 1 were considered and it was recommended that the Organization re-examine the Regulations with a view to relaxing the obligations imposed by certain articles.

The Seventh Revision of the International Classification is to be incorporated into the Manual of which a new edition is to be ready for use from 1 January 1958.

The conference also considered various methods of obtaining information on diseases and causes of death in areas in which application of the International Statistical Classification is impossible for lack of physicians and health services capable of making sufficiently precise diagnoses. It was suggested that WHO establish an expert group to study such methods and co-ordinate the national and regional studies already undertaken.

Other matters discussed at the conference included the training of personnel for coding causes of death, and the education of the medical profession in accurate certification of cause of death; adaptation of the International Statistical Classification to the needs of armed forces; use of the Classification as a diagnostic index; the possible establishment of an international code of surgical operations; the relationship between clinical and autopsy diagnoses; and National Committees on Vital and Health Statistics to which some of the issues and problems considered at the conference may be referred for study.

International Pharmacopoeia

At its meetings previous to the fifteenth session of the Executive Board, the Standing Committee on Administration and Finance reviewed the distribution and sale of WHO publications including the *Pharmacopoeia Internationalis*. It was reported that about 1800 copies of the English edition and 1640 copies of the French edition of Volume I of the *Pharmacopoeia* had been sold up to the end of 1954. These two editions were published in 1952; a Spanish edition appeared in 1954. A second volume of the *Pharmacopoeia* is now in preparation and is expected to be published in the course of 1955.

This, the first international pharmacopoeia and the culmination of efforts begun in 1937 by the League of Nations Health Organisation, is a publication of considerable importance to physicians, pharmacists and others concerned with pharmaceutical preparations. It contains proposed specifications, nomenclature, symbols and posology for a number of important pharmaceutical preparations. They can be used as a basis in the revision and in the preparation of specifications in the various countries. It is recognized that the International Pharmacopoeia constitutes only a recommendation and is not intended to be a legal pharmacopoeia in any country unless adopted by the national authorities competent in the matter of specifications for pharmaceutical preparations.

Reports of Expert Groups

ADDICTION PRODUCING DRUGS

The WHO Expert Committee on Drugs Liable to Produce Addiction recommends in its fifth report,¹ that the following be considered as addiction producing drugs and therefore subject to the relevant controls 6 methyl dihydromorphine dihydrohydroxy morphinone and the synthetic substances 4 4-diphenyl-6 dimethylamino 3-hexanone 4 4 diphenyl 6 piperidino 3 heptanone, and the isopropyl and other esters of 1 methyl 4 phenylpiperidine 4-carboxylic acid Two other drugs considered as constituting a risk to public health because of their convertibil

ity to substances liable to produce addiction are the myristyl ester of benzylmorphine and β 4 4-diphenyl 6-dimethylamino 3 heptanol

The committee drew particular attention to the present status of addiction to pethidine It considered that an important factor in the increasing tendency to pethidine addiction has been the attitude of physicians towards the drug based on the widespread but erroneous belief that pethidine is less dangerous than morphine with respect to addiction liability The committee therefore emphasized the need for the same care in the use of pethidine as with morphine

Other addiction problems included in this report are the mastication of the coca leaf and the situation concerning *Cannabis sativa*

Wild Hlth O g techn Rep Ser 1955 95 16 pages Price 1/9 \$0 30 or Sw fr 1 — Published in English French and Spanish

Notes and News

Executive Board Fifteenth Session

The fifteenth session of the WHO Executive Board was held in Geneva from 18 January to 4 February 1955, under the chairmanship of Dr H van Zile Hyde Professor O Andersen and Professor M J Ferreira were Vice Chairmen and Professor J S Saleh and Dr H B Turbott were Rapporteurs

The Standing Committee on Administration and Finance met for seven days in advance of the Board's session and on a number of occasions during the session for a total of sixteen meetings Dr H B Turbott was Chairman of these meetings at which

were considered in detail the proposed programme and budget for 1956

The Executive Board recommended that the Eighth World Health Assembly accept the Director General's proposals for the 1956 programme and for a budget of \$9 612 000 It also approved and recommended to the Health Assembly the proposed general programme of work for the period 1957 1960 expressing in its resolution appreciation of the support to world health which has been given by governments but calling attention to the disparity between the resources which have so far been available to the Organization

and the increasingly expressed needs of governments for assistance in strengthening their health services

One of the important decisions of the Board concerned WHO's role in promoting the peaceful uses of atomic energy and protecting workers and the general public against atomic radiation. As noted on page 133 of this number of the *Chronicle* this question became an urgent one following the resolution on international co-operation in developing the peaceful uses of atomic energy which was adopted by the General Assembly of the United Nations at the ninth session¹. The Board recognized that developments in the application of atomic energy will undoubtedly influence the Organization's work. It welcomed the invitation of the General Assembly to participate in the international conference on atomic energy, endorsed the preliminary action taken by the Director General in calling together a consultant group and submitting a note through the Secretary General of the United Nations to the advisory committee on the conference, requested that the Director General continue to co-operate with those concerned in preparing the conference and authorized him to take appropriate measures to prepare WHO's contribution to the conference, and requested the Director General to follow developments in the establishment of an International Atomic Energy Agency with a view to ensuring the Organization's co-operation with such an agency.

Another public health problem which was given much consideration was the implication for malaria control of the development in anophelines of resistance to residual insecticides. The Board examined the relevant recommendations of the XIV Pan American Sanitary Conference (sixth session of the Regional Committee for the Americas) and of the Second Asian Malaria Conference and recommended for adoption by the Eighth World Health Assembly a resolution in which attention is drawn to "the potential danger of a development of resistance to insecticides

in anopheline vector species" and governments are requested to "intensify plans of nation wide malaria control so that malaria eradication may be achieved and the regular insecticide spraying campaigns safely terminated before such resistance occurs".

Special mention was made of environmental sanitation as a fundamental part of public health programmes. The Director General was requested "to draw the attention of Member States to the necessity particularly in developing countries of giving priority to both short and long term planning in environmental sanitation in their annual programmes and budgets in public health". Other programme items which were subject to some discussion were the Organization's initiation of work on poliomyelitis research provision in the programme and budget for 1956 for the services of a dental health officer and the convening together with FAO of "a conference of representatives of national committees or similar groups now working on food additives together with representatives of intergovernmental or non governmental groups concerned with the subject".

Upon recommendation of the Standing Committee on Non Governmental Organizations a number of non governmental organizations were admitted into official relations with WHO: the International Union for Health Education of the Public, the International Hydatidological Association, the International Society of Criminology, the International Society for Blood Transfusion and the International Organization against Trachoma.

At this session the Board studied a report on programme analysis and evaluation presented by the Director General and forwarded this report as its report to the Eighth World Health Assembly. It recommended to the Health Assembly that the subject of the next organizational study be "the question of programme planning with particular reference to the integration of preventive and curative medicine in the public health programme".

The work of the Standing Committee on Administration and Finance and of the Execu

¹ This resolution is reproduced in the 3 Appendix A of the 8th W.H.A. Org. 80

village mills or that the Government subsidize the exchange of village maize for wheat enriched with iron. Both approaches might be tried out in selected areas and then checked eighteen months to two years later to determine which was the more satisfactory.

As part of its continuing aid in the improvement of nutrition in Egypt, WHO intends to provide a consultant to assist the Government in planning a nutrition institute.

Venereal Disease Treatment at Ports

In a circular letter to Member States, the Director General has requested that governments inform the Organization of any changes which they wish to make in the *International list of venereal-disease treatment centres at ports*, the most recent edition of which was published in 1951. The List, which is a result of the Brussels Agreement of 1924 providing for free treatment in the major ports for seafarers suffering from venereal infections, is to be revised and brought up to date during 1955. The Director General has asked that all communications concerning it be sent in time to reach him not later than 1 July 1955. More than three thousand copies of the List have been distributed or sold to health administrations, port medical officers, shipping companies, and other interested organizations and persons.

Governments have also been requested to co-operate in a study of treatment methods and other aspects of venereal disease control

at ports. To this end a questionnaire has been sent for completion by medical officers and other physicians in charge of the venereal disease treatment facilities included in the International List. This study of venereal disease control among seafarers is being made in accordance with recommendations of the Joint ILO/WHO Committee on the Hygiene of Seafarers and the WHO Expert Committee on Venereal Infections and Treponematoses.

Exchange of Medical Publications

WHO is now acting as agent for the free distribution and exchange of surplus publications between medical institutions throughout the world. The Organization informs medical libraries in Member States concerning the availability of medical books and periodicals offered by libraries in other countries. It does not itself collect and make shipments of publications but is simply acting as a central information service for medical libraries wishing to exchange and distribute books and periodicals. All shipments are made directly from one medical library to another after agreement has been reached on the specific items required and on the question of transport costs.

Through its Library and Reference Services, WHO is already in touch with many medical libraries throughout the world. It will be glad to receive from new libraries offers of exchanges accompanied by lists of the most needed publications.

Review of WHO Publications

The Rural Hospital Its Structure and Organization By R F Bridgman Geneva, 1955
(*World Health Organization Monograph Series No 21*) 162 pages Price £1, \$4 00
or Sw fr 12 — (clothbound)

While the hospital's sole function used to be to provide hospital care for the sick, there is now a tendency to expand its scope to cover the whole community, through out patient and preventive medical services. The rural hospital may in addition extend its activities to include health education and to serve as a demonstration centre for general hygiene work. This concept of combined health activities can be expressed in the creation of hospital/health-centres responsible for safe guarding all aspects of the population's health. Such an institution is described in this monograph by Dr R F Bridgman, Deputy Director of Health of the Department of the Seine France, and Chief Inspector of Health who addresses his work particularly to countries that do not as yet possess a hospital network or that may find it possible to adapt their present establishments to the newer ideas.

After having placed the rural hospital within the framework of a general hospital organization and having emphasized the necessity for flexibility of functions the author deals with the practical aspects of his subject. One chapter is devoted to the structure of the hospital that is to the various services which it may comprise—medical maternity paediatric, surgical communicable disease tuberculosis mental health occupational health and health education it being obvious of course that every rural hospital will not have every service. Dr Bridgman then goes on to

examine the architecture and equipment of the rural hospital giving some suggested plans. Architecturally hospitals should be designed so that they can be adapted to developments in the health situation. Buildings must be simple and as little mechanized as possible since qualified personnel for on the spot repairs may not be available.

In general the quality of treatment will depend more on the staff than on the premises and a chapter of the monograph is therefore devoted to personnel—medical nursing technical and administrative—and to the organization of the work.

In a final chapter entitled From theory to practice the author discusses the manner in which rural hospitals can be integrated into the general hospital system of a country or a region and the means of financing hospitals. He considers the types of organization suitable for primitive regions in tropical zones for under developed regions with dense agricultural populations for regions in the course of economic development, and finally for rural regions which might be termed advanced.

The author's extensive knowledge of hospital organization in widely differing regions of the world and the thorough study which he has made of the rural hospital give weight to his assertion that the rural hospital is an essential element in evolving a health programme and has proved to be the most rational means for improving the physical and social condition of country dwellers. It is the instrument of any comprehensive health policy and one of the indispensable stages in any scheme for the economic improvement of rural areas.

Bulletin of the World Health Organization
1955 12 No 4 number on virus meningo-
encephalitis and poliomyelitis 200 pages
Price 10s \$2.00 or Sw fr 6— Articles
in English or in French with resume in the
other language

The importance of a number of virus diseases as causes of human morbidity and mortality is receiving increasingly wide recognition. This is doubtless due in part to the fact that the effective control of epidemic bacterial diseases has left the uncontrolled virus diseases relatively more prominent. But it is also due to improved diagnosis and reporting and for some diseases to an undoubtedly increase in their actual incidence.

These trends are well illustrated in the articles published in this number of the *Bulletin of the World Health Organization*. Various aspects of two virus diseases which may easily be confused are described—an arthropod borne virus meningo-encephalitis and poliomyelitis.

The first series of papers on meningo-encephalitis describes in detail a disease which has only recently been recognized in Central Europe although it appears possible that it may have been present for many years. A large outbreak in 1953 presented an opportunity for an international study of the disease in which workers in Austria, the Netherlands, the United States of America and Yugoslavia took part. Its epidemiology, virology and clinical aspects have been studied in detail and it is clear that it falls into the group of encephalitides comprising Russian spring-summer encephalitis and louping-ill. There is evidence that it is arthropod borne but the actual vectors and reservoirs have not yet been finally identified.

This work together with previous observations by Czech and Russian workers suggests that similar strains of virus are widespread in southern parts of Central and Eastern Europe. However, further serological surveys of both human and potential animal reservoirs are needed to determine the extent of the endemic area.

An interesting and important observation in the clinical field is that in a number of cases

it was impossible to distinguish this disease on clinical or pathological grounds from poliomyelitis. The correct diagnosis can only be made with certainty in the virus laboratory. The importance of laboratory diagnosis of virus diseases is made further apparent in an article on poliomyelitis in 1953 in which a study is made of the types of virus responsible for outbreaks of poliomyelitis. The results of some 2200 isolations of the three recognized types of poliovirus are reported but a surprisingly large number of other viruses have been isolated from cases of clinical poliomyelitis both paralytic and non paralytic which can not be neutralized by type specific poliovirus serum. The significance of these viruses is still obscure but it is evident that further studies are needed both of these agents and on the etiology of clinical illness resembling poliomyelitis in which there is serological and virological evidence that poliovirus is not the causative agent.

Two other papers on poliomyelitis describe the recent severe outbreaks in Israel and the results of a study of the state of immunity of the various population groups in that country. The special epidemiological circumstances arising from the emergency movements of large population groups bring to light a number of interesting points, perhaps one of the most important being the danger of severe local outbreaks resulting from the crowding of susceptible infants.

Inventories of apparatus and materials for teaching science Volume III technical colleges Part 5 medical sciences UNESCO Paris and WHO Geneva 1954 191 pages Price 15/6 \$2.75 or Sw fr 9.50

To aid medical teaching institutions in selecting essential equipment for courses in the basic medical sciences WHO has prepared lists of materials for use in teaching the relevant subjects which form part of a UNESCO series of inventories of apparatus and materials for teaching science at all levels.

The primary purpose of publishing such inventories is to help in implementing plans for adequate teaching of science in schools and colleges in war damaged and under developed regions but a second end is also served—that of promoting a certain amount of uniformity in course content or at least an approximate comparability in the standards of teaching in various countries of the world to bring about equivalence of degrees and diplomas irrespective of the universities and institutions where they are awarded

'Uniformity and equivalence', in this instance do not imply that educational institutions should be alike in all respects. In fact in the case of medical schools their courses should reflect the health needs and resources of their own country. However, certain guide lines may be useful as a starting point for the establishment or reorganization of certain departments or for setting up new teaching institutes. These inventories of teaching apparatus and materials indirectly provide such guide lines

The inventories do not represent the opinion of one individual specialist in each subject but are the result of the collaboration of 129 professors in 92 medical schools

The lists of equipment are grouped under seven headings according to subjects or combinations of subjects (1) anatomy and histology, (2) physiology (3) biochemistry

(4) pharmacology, (5) bacteriology (6) morbid anatomy and (7) preventive and social medicine (hygiene and public health). Each list is preceded by an introduction in which the content of the subject course is considered and the criteria of the choice of equipment specified. These introductions contain much information of a general and practical nature on the teaching of undergraduate medical courses

The inventories relative to courses in preventive and social medicine take into consideration the fact that different syllabi will be required in different countries depending upon the stage of development of the public health services of the country. Accordingly three courses are outlined: one in which the approach is chiefly through environmental hygiene and sanitation; a second in which greater emphasis is placed on epidemiology, maternal and child care and the organization of preventive health and medical services, and a third in which the aim is to teach the elements of social pathology and the methods of application of socio medical and medical services to a population

It is envisaged that further editions of these inventories will be published in which may be incorporated the suggestions and constructive criticisms which this first edition will have elicited and the changes which advances in scientific knowledge and in teaching methods will have made essential

POLIOMYELITIS

408 pages clothbound 69 illustrations including 27 photographs and 34 graphs Index.

Price £2 \$8 00 Sw fr 24—

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Incidence of poliomyelitis since 1920 — *Mathieu-Jean Freyche & Johannes Nielsen*
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ANNUAL EPIDEMIOLOGICAL AND VITAL
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ORGANISATION MONDIALE DE LA SANTÉ
WORLD HEALTH ORGANIZATION

PALAIS DES NATIONS

GENÈVE

1955



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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SCHEDULE OF MEETINGS

- 6-10 June Advisory Group on Veterinary Public Health Geneva
- 9-22 June Third Inter American Statistical Conference Rio de Janeiro
- 4-28 July Nursing Education Seminar Suva, Fiji
- 25-30 July Expert Committee on Environmental Sanitation fourth session Geneva
- 26-29 July European Regional Advisory Group on Water Standards Geneva

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POLIOMYELITIS IN 1953

The discovery by Enders and his colleagues that poliomyelitis virus can be grown in tissue culture and subsequent developments in poliomyelitis research "have transformed poliomyelitis from a disease which could be studied only with difficulty and at great expense and for which no prospect of control was apparent into a disease which can now readily and relatively cheaply be studied in the laboratory and for which there are encouraging prospects of effective control measures." Successful application of control measures now under development will depend however on sound knowledge of the epidemiology of poliomyelitis in different areas—knowledge which is currently obtainable for very few places. It is largely for the purpose of stimulating further acquisition of this knowledge that the limited information now available on the epidemiology of poliomyelitis forms part of a recent article in the *Bulletin of the World Health Organization* the latest study in the WHO statistical series on poliomyelitis.¹ Together with data on cases of and deaths from this disease in a number of countries and territories age distribution of cases and seasonal variations in incidence such virological information as could be obtained has been included in this study.

REPORTED INCIDENCE

Africa

In 1952 and 1953 there was a serious rise in the number of notifications of cases of poliomyelitis in Egypt—260 and 551 cases registered respectively in contrast with a total figure of 76 for the period 1944-51. This

increase is believed to be attributable largely to better reporting of cases.

For most of the rest of the African continent and islands covering about forty countries and territories the 1953 notifications (about 2170) differed very little from those of the previous year (2210). There was a considerable increase in apparent morbidity however in Angola Middle Congo (French Equatorial Africa) Upper Volta (French West Africa) Morocco (French Zone) Tunisia Ruanda Urundi Tanganyika and the Union of South Africa. On the other hand there was a drop in the apparent incidence in Mauritius Uganda Kenya Algeria Mozambique Northern Rhodesia and Southern Rhodesia.

In the Belgian Congo the apparent morbidity figures rose as compared with those for 1952 736 cases with 59 deaths were notified in 1953. Angola experienced a poliomyelitis epidemic in 1953 which although less serious than the epidemic of 1951 was of considerable importance—378 cases and 19 deaths as compared with 764 cases and 60 deaths during the previous epidemic.

America

While there was an appreciable drop in the number of notifications of cases of poliomyelitis in 1953 in Chile Cuba, and the USA and a less marked decrease in Alaska Guatemala the Panama Canal Zone Peru Puerto Rico and Venezuela there was a substantial rise in apparent morbidity in Argentina Brazil Canada Colombia El Salvador Greenland Mexico Nicaragua and Uruguay. The disease reached epidemic proportions in Greenland.

In 1953 Canada had the most serious outbreaks of poliomyelitis ever recorded in

¹ Ferlic M J, Pine A, M L, Lederer C (1953) *Bull. W.H.O.* 12, 95.

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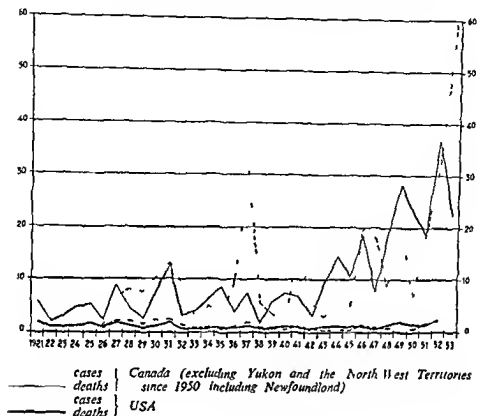
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¹ Freyche, M. J. P. 1954. A. M. M. & Lederer, C. (1954).
Bull. Wld Hlth Org. 12, 59.

FIG 1 ANNUAL INCIDENCE OF POLIOMYELITIS CANADA AND UNITED STATES OF AMERICA 1921-53 (RATES PER 100 000 INHABITANTS)



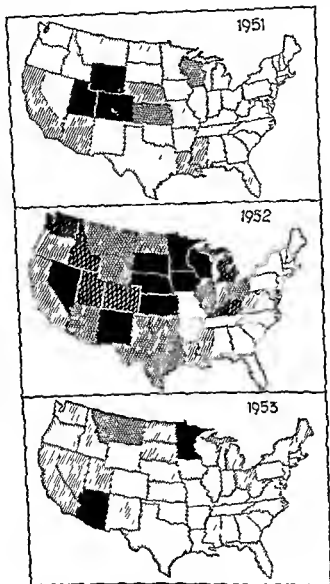
its history. Notifications numbered 8734, an increase of 84% over the figure for 1952 which constituted the previous record. This exceptionally high incidence affected six provinces only: Newfoundland (233 notifications as compared with 4 in 1952), Quebec Province (488 as compared with 125), Ontario (2239 as compared with 705), Alberta (1425 as compared with 740), British Columbia (797 as compared with 596), and, in particular, Manitoba (2320 cases as compared with 839). The 2320 cases in Manitoba represented 27% of the total and exceeded the annual figures for Canada in most of the twenty-nine preceding years. It is interesting to note that the three provinces with the highest morbidity rates were among those with the lowest average population density. The notification rate for the country as a whole was 59 per 100 000 inhabitants as

compared with 33 in 1952 and 18 in 1951. This rate considerably exceeded the record rate registered in the USA in 1952—37 cases per 100 000 inhabitants.

Of the 8734 cases of poliomyelitis notified, 42% were paralytic forms of the disease, 35% non-paralytic forms, and 23% non-specified forms. In Manitoba, paralytic symptoms were noted in 30% of patients over 20 years of age. According to the available provisional data, there were 398 deaths in the country as a whole, the provisional mortality rate being about 2.7 per 100 000 inhabitants (The final rate for 1952 was 2.2).

In the USA, there were 35 592 notifications of poliomyelitis in 1953, 39% less than in 1952, the record year. Of these notifications, 60% were from ten States which contain 52% of the country's population. California,

FIG 2 DISTRIBUTION OF POLIOMYELITIS UNITED STATES OF AMERICA 1951 3



Cases per 100 000 inhabitants

0-9.9 10-19.9 20-29.9 30-39.9 40-49.9 50-59.9 60+

Preliminary rates based on annual figures published by the National Foundation for Infantile Paralysis

4078, New York 2984, Ohio 2635, Michigan 2346, Minnesota, 2254 Illinois, 2041, Texas 1751 Pennsylvania 1471 North Carolina 926 and Missouri 877 Fig 2 shows the 1953 notification rates per State compared with those for the two preceding years The most marked improvements were observed in Nebraska (231 notifications in 1953 as compared with 2247 in 1952) Iowa (613 as compared with 3564) Kentucky (368 as compared with 1762), New Mexico (108 as compared with 502) South Dakota (225 as compared with 1017) Idaho (97 as compared with 353), Delaware (32 as compared with 117) Colorado (194 as compared with 688) and Kansas (515 as compared with 1718)

Forty four per cent of the cases were registered as paralytic, 34% as non paralytic and 22% were non specified forms The provisional mortality figure is 346, giving an extremely low case fatality rate of about 1.3% This is probably somewhat lower than the real rate however since the case fatality rate was never lower than 5.4% during the ten preceding years

The situation in some of the other countries of the Americas was as follows

Mexico—The number of notifications in 1953 (1787) has been exceeded only once since 1937 (in 1951)

Nicaragua—The available data indicate that this country suffered in 1953 the most serious epidemic so far observed

Brazil—In the State capitals and Federal District of Brazil the provisional notifications for 1953 (940 cases 79 deaths) almost equalled the total for the eight preceding years

Argentina—Provisional reports for the year give 2537 notifications there is reason to suppose that the final figures will be higher

Asia

Throughout 24 Asiatic countries or territories only about 3950 cases of poliomyelitis were notified in 1953—more than 1000

fewer than in 1952 This total does not include India for which only hospital statistics are known or Pakistan where 22 cases were noted

Although the available information is inadequate it would seem that poliomyelitis morbidity decreased in Cambodia (where 1952 was an epidemic year), Ceylon India Israel, Lebanon Philippines and Thailand In only a few countries were the 1953 figures higher than those for 1952

Europe

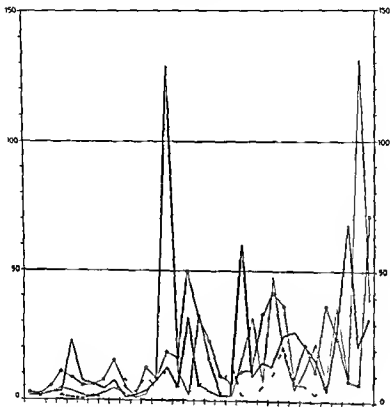
Statistical data are available for 26 European countries or territories About 27 000 cases of poliomyelitis were notified in 1953 as compared with 32 000 in 1952 Fifty six per cent of these occurred in three countries—England and Wales Italy and Sweden Incidence increased in 15 countries and decreased most markedly in those which had been most affected by poliomyelitis in 1952 (Belgium Denmark Federal Republic of Germany Luxembourg and the Netherlands) In the latter countries only 4196 cases were registered in 1953 as compared with 17 863 the previous year

Fig 3 and 4 show the poliomyelitis morbidity and mortality rates for Scandinavia and Finland for the past 30-33 years in so far as they are indicated by official statistics, and the distribution of the cases for 1950-3

In Sweden the 1953 epidemic was the most serious ever recorded in that country 5090 cases were notified nearly 2000 more than in 1936 which was the previous record year While final mortality statistics are not yet available the provisional figures seem to indicate a relatively low case fatality rate as compared with the final rates for the years 1945-52 The age distribution of the 27 deaths from poliomyelitis noted in Stockholm during 1953 is interesting 0-15 years 1 death (between 10 and 15) 15-20 years 1 death 20-40 years 19 deaths 40-60 years

FIG 3 ANNUAL INCIDENCE OF POLIOMYELITIS SCANDINAVIA AND FINLAND 1921-53
(RATES PER 100 000 INHABITANTS)

(A) Cases



(B) Deaths

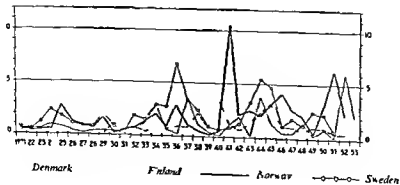
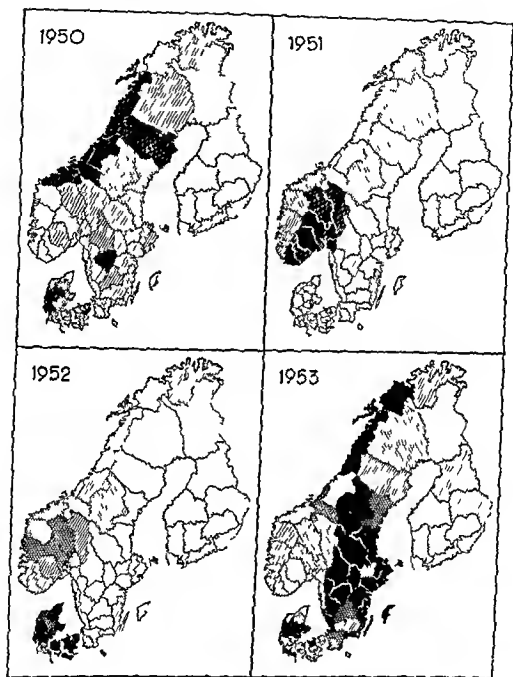


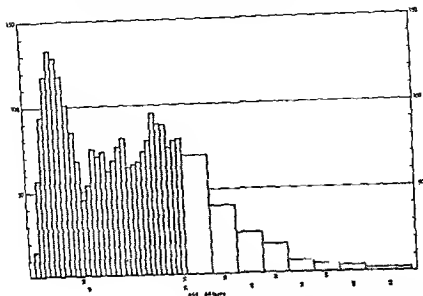
FIG 4 DISTRIBUTION OF POLIOMYELITIS SCANDINAVIA AND FINLAND 1950-3



Cases per 100 000 inhabitants

0 0.1-9.9 10-19.9 20-29.9 30-39.9 40-49.9 50-59.9 60+

FIG 5 NOTIFIED CASES OF POLIOMYELITIS (PARALYTIC ONLY) BY AGE GROUP SWEDEN 1953
(RATES PER 100 000 INHABITANTS)



Based on data received from G. Ölin (personal communication)

6 deaths. The percentage of paralytic cases was approximately the same as in recent years: 1950 68%, 1951 62%, 1952 74%, and 1953 60%. Fig 5 shows the age incidence of paralytic cases for the whole country in 1953. In Finland the 316 cases notified in 1953 (80% of them in rural areas) represent the

TABLE 1 NOTIFIED CASES OF POLIOMYELITIS BY AGE GROUP DENMARK 1950-3

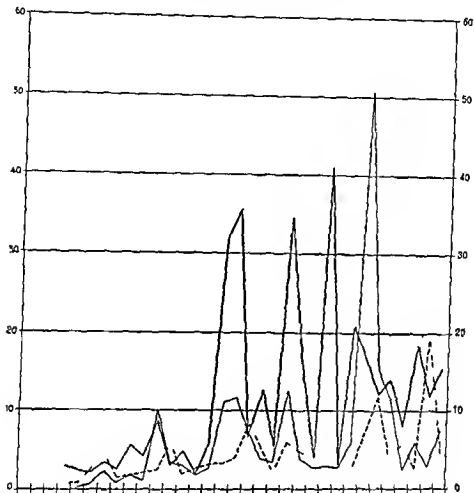
Age-groups (years)	1950		1951		1952 ^a		1953 ^a	
	no. of cases	%	no. of cases	%	no. of cases	%	no. of cases	%
under 1	52	3.9	70	2.8	165	2.9	42	0.5
1-4	451	28.7	58	15.1	1 675	23.3	410	24.2
5-14	625	43.8	195	50.3	2 284	39.6	717	42.3
15-64	373	24.1	119	31.1	1 911	27.9	523	30.8
65 and over	1	0.1	1	0.3	18	0.3	4	0.2
Total	1 571	100.0	383	100.0	5 711	100.0	1 696	100.0

Final figures

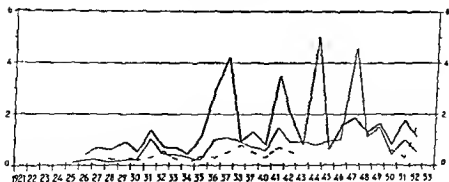
^a Preliminary figures

FIG 6 ANNUAL INCIDENCE OF POLIOMYELITIS CENTRAL EUROPE 1924-53
(RATES PER 100 000 INHABITANTS)

(A) Cases



(B) Deaths



— Austria
 - - - Germany (1924-43 old " Reich 1946-53 Federal Republic of Germany)
 - . - Switzerland

second highest morbidity rate since 1946 the highest having occurred in 1950

The 1953 epidemic in Norway seems to have been one of the most severe there were 1095 final notifications the highest number recorded except for 1951 (2233) and 1941

In Denmark notifications reached a final figure of 1591—a much lower figure than that for the preceding year (5676) Distribution of notified cases by age over the past four years is given in table I

It will be noted that the number of cases in the youngest age groups tended to decrease while the higher age groups were more and more affected a tendency which seems to be present in a number of countries

Fig 6 shows the incidence of poliomyelitis in Austria Germany and Switzerland from 1924 to 1953 There was a marked improvement in the Federal Republic of Germany

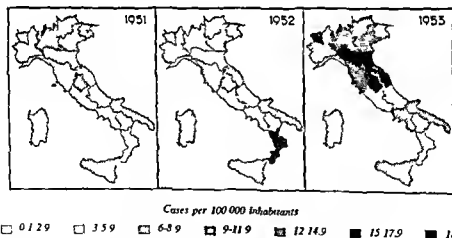
highest incidence during the past ten years with the exception of 1944 (record year with 1793 notifications) 1946 and 1951

Morbidity rates decreased as compared with 1952 in Belgium Luxembourg Malta the Netherlands Portugal Turkey and especially Spain The number of notifications increased in England and Wales France Greece Italy (4995 as compared with 2708 in 1952) Scotland Northern Ireland the Republic of Ireland Trieste (British/USA Zone) and in particular Yugoslavia (603 cases with 25 deaths as compared with 128 cases and 10 deaths in 1952)

Oceania

In the 19 countries or territories of Oceania for which statistics are available for the past two years 2201 cases of poliomyelitis were notified in 1953 as compared with 2961 for

FIG 7 DISTRIBUTION OF POLIOMYELITIS ITALY 1951-3

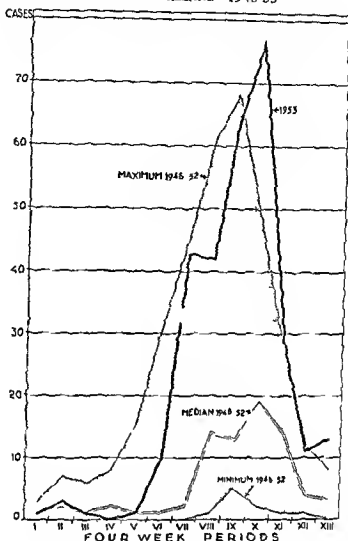


(2243 notifications in 1953 as compared with 9517 in 1952 the record year) and an increase in incidence in Austria 1953 may be considered an epidemic year in Switzerland the 764 notifications represented the

1952 In the Cook Islands Guam Netherlands New Guinea and New Caledonia 27 cases were notified whereas there were none in the previous year

Maoro excl. Fed

FIG 8 NOTIFIED CASES OF POLIOMYELITIS BY FOUR WEEK PERIOD
NORTHERN IRELAND 1946-53



RESPONSIBLE VIRUSES

Knowledge concerning the viruses responsible for poliomyelitis in different parts of the world is still scanty. Yet information on the characteristics and behaviour of the prevalent viruses both poliovirus and others which may cause similar clinical syndromes is essential if immunization procedures are to give satisfactory results, since the immunity produced must be specifically effective against the prevalent infecting organisms responsible for clinical disease.

Systematic studies have been undertaken

in some countries and the resulting information has been made available to WHO by members of the Expert Advisory Panel on Virus Diseases and by a number of other leading workers on poliomyelitis. This information has been incorporated into the *Bulletin* report on poliomyelitis in 1953.

Africa

Investigations have been made in Africa on the types of poliovirus prevalent in several areas. In Johannesburg in the summer of 1953-4, a year of average incidence there were three waves of infection the

first, early in the season due to type 3 the second in mid summer due to type 2 and the third in the autumn due to type 1 In Salisbury Southern Rhodesia type 1 was prevalent in the summer of 1951 2 type 2 in 1952 3 and type 3 in the autumn of 1954 Nearly all the cases in an outbreak in 1954 in Port Elizabeth, Cape Province (Union of South Africa) were due to type 2 virus A recent (1954) outbreak in Kenya was due to type 1 virus

America

Some information on viruses from cases of poliomyelitis in Canada is available In Toronto in 1952 7 type 1 and 2 type 3 viruses were identified in Saskatoon and Vancouver in the same year 4 type 1 viruses and 2 "orphan" viruses were recovered from cases of paralytic poliomyelitis and in Kimberley 3 type 3 strains were identified In 1953 56 type 1 poliomyelitis viruses were isolated 13 in Manitoba 4 in Newfoundland 1 in Nova Scotia 33 in Ontario and 5 in the Yukon

An epidemic in Jamaica in 1954—the first to occur in the island—was due to type 1 virus

More information is available for the USA than for any other country but even here it is incomplete Some of the data provided by individual workers in different parts of the country are summarized below

Place	Year	Poli virus type 1	type 2	type 3	Orphan
Minneapolis	1946	7	0	0	
and the north central States	1948	59	0	0	
	1949	9	11	0	
	1940	21	1	32	
	1951	12	2	1	
	1952	77	0	8	
	1953	355	1	8	
	1954	6	2	2	
New Haven Conn	1955	5	8	5	

The term "orphan" is used to describe the several different genotypes isolated from stool which are not precise because their origin is not certain. These genotypes have been isolated from morbidities. These genotypes have been isolated from stool. The have often been referred to by the phrase "orphan" because of their non-specific nature.

Place	Year	Poliomyelitis type 1	type 2	type 3	Orphan
Pennsylvania					
Lock Haven	1952	46	15	0	
Easton	1950	12	1	3	
Philadelphia	1953	19	3	5	3
Pittsburgh area	1949-51	28		9	
Utah	1951	26	3	0	2
Texas	1952	66	13	12	11
Iowa Nebraska	1952	125	0	0	3
Boston Mass	1949	16	0	1	
	1950	6	0	25	
	1951	11	1	3	
	1952	38	11	8	
	1953	34	3	0	
Ohio	1952	33	0	0	

Information collected systematically and classified in order of

Asia

Thirty one strains of poliovirus have been isolated in Israel 29 type 1 1 type 2 and 1 type 3 Fourteen "orphan" viruses have been isolated including 11 from paralytic cases

A number of strains of poliovirus have been isolated in Bombay and 5 have been typed 4 type 1 and 1 type 2 The classification of 5 strains selected from various parts of Japan has been reported 1 type 1 2 type 2 and 2 type 3

Europe

Information available from Belgium is tabulated below

Year	Poliomyelitis type 1	type 2	type 3
1952	4	1	0
1953	3	0	1
1954 (first half)	4	0	0

In Denmark, the outbreaks in 1952 and 1953 were due to type 1 virus Up to the present only 1 type 3 strain has been isolated in the country and only type 1 strains in 1954 Seven strains of "orphan" virus have been isolated from clinical cases of poliomyelitis

Information on the first 50 strains isolated and typed in France in 1952 and 1953 reveals 31 of type 1 3 type 2, and 8 type 3

In Germany in 1952, 3 type 1 and 1 each of types 2 and 3 were isolated. Outbreaks in Saarland in 1951 and in North Rhine Westphalia in 1952 were due to type 1 virus

Twenty three strains of poliovirus were isolated in northern Italy in 1953-4 14 type 1 8 type 2 and 1 type 3. In general both types 1 and 2 were found in the same locality. Sixteen orphan viruses were isolated from cases diagnosed as paralytic poliomyelitis

In the Netherlands the relatively high incidence of the disease in 1951 and 1952 was apparently associated with a predominance of type 1 strains as was the case in the neighbouring parts of Belgium Germany, and Luxembourg in 1952

Attempts to isolate virus during the 1953 Stockholm epidemic gave the following results

<i>Clinical diagnosis</i>	<i>No. of cases</i>	<i>Poliovirus type 1</i>	<i>Orphan viruses</i>
Paralytic poliomyelitis	175	127	1
Non paralytic poliomyelitis (with meningitis)	86	61	1
Suspected poliomyelitis (without meningitis)	28	7	2

Approximately 150 more type 1 strains were isolated from this epidemic bringing the total to about 350 strains. Types 2 and 3 were found in only one case each

Both type 1 and type 3 virus have been incriminated in recent outbreaks of poliomyelitis in the United Kingdom. Seventy seven strains of poliovirus have been isolated from faeces and have been typed 38 type 1 30 type 2, and 9 type 3—a higher proportion of type 2 than has generally been found. All strains were isolated from paralytic cases

Oceania

In Australia poliovirus type 1 was associated with epidemic prevalence in Victoria in 1949, 1951, and 1953-4. The epidemic in 1952-3 was caused by type 2 virus. However, all three types have been isolated throughout the period although type 3 has been responsible for sporadic cases only

* * *

Information concerning the types of virus responsible for outbreaks of poliomyelitis is obviously too fragmentary to justify drawing any definite conclusions. The total number of polioviruses isolated and typed from clinical cases since the different types were recognized is probably not much more than 3000 to 4000. Of the 2200 strains considered in the *Bulletin* study, 84% are type 1 7% type 2, and 9% type 3. It is pointed out however, that this does not represent a relative prevalence of the different types

"Serological studies have made it clear that all three types are widely distributed and that as a generalization antibodies are acquired to all three types at about the same rate. This implies that the three types are about equally common. All that can be said is that in these selected areas [i.e. those included in the *Bulletin* article] type 1 virus has been most frequently isolated in tissue cultures and that this type predominates in the majority of observed outbreaks particularly in the most severe ones

Much more research is needed on the virology of poliomyelitis. Many viruses other than poliovirus can cause the clinical picture of non paralytic poliomyelitis and there is evidence to suggest that there are viruses other than the three recognized types of poliovirus which can give rise to the clinical symptoms of the paralytic form of the disease

ADVANCES IN THE MANAGEMENT OF ACUTE POLIOMYELITIS

The transformation of the relatively uncommon infantile paralysis of the 19th century into epidemic poliomyelitis of almost worldwide distribution presents today one of the most formidable public health problems. In introducing their report¹ with these words the members of the WHO Expert Committee on Poliomyelitis summed up the gravity of the present situation.

Since 1950 WHO's active concern with the problem of poliomyelitis has been steadily increasing as the relevant activities of the past five years bear evidence—the convening of an expert committee which in its first report set forth a clear and concise statement of present knowledge of poliomyelitis, the establishment of a widening network of laboratories for the study of poliomyelitis along the same lines as the WHO network of influenza centres, the publication of a monograph² on the various aspects of poliomyelitis (epidemiology, virology, immunology, diagnosis, treatment, especially of bulbar and respiratory forms and public health measures for its control) with contributions from specialists of worldwide reputation and finally and most recently the organization under the auspices of the Regional Office for Europe of an international training course in recent techniques in the management of poliomyelitis patients held in Copenhagen from 14 April to 5 May 1955 and attended by about forty doctors and nurses.

This course was sponsored by WHO in response to wishes expressed during the Seventh World Health Assembly; delegates from several countries requested that courses

be arranged for demonstrating treatment methods for the life-threatening forms of poliomyelitis (i.e. the respiratory and bulbar forms) in particular for teaching the techniques which applied as emergency measures by Dr H. C. A. Lassen during the Copenhagen epidemic of 1952, resulted in the saving of a considerable number of lives. It was recognized that to meet similar critical situations it is necessary to train personnel to cope with epidemics in which many patients are stricken with respiratory paralysis.

In the opinion of Dr Lassen "optimal treatment of bulbar poliomyelitis with or without respiratory failure is one of the most complex therapeutic problems in the whole field of medicine. It is now accepted that the all important problem in life-threatening poliomyelitis is respiratory in nature. Failing ventilation may be of spinal or bulbar origin. It may be due to the comatose state caused by polioencephalitis or it may result from the blocking of the bronchi by secretions from atelectasis, pneumonitis and pulmonary oedema. Formerly the prognosis of bulbar poliomyelitis was considered very unpromising and a certain defeatism regarding therapy prevailed. It was thought that the symptoms were due to an "overwhelming intractable" virus infection of the medulla oblongata, pons and midbrain. This is in fact true in certain cases. But the new concept of failing ventilation due to various causes and amenable to mechanical treatment for the maintenance of an unobstructed airway has proved extremely fruitful.

Table I shows the incidence of and mortality from the various forms of bulbar and respiratory poliomyelitis among 345 cases treated during the Copenhagen epidemic.

Wld Hlth Org. An. R. p. S. 1954, 81
Poliomyelitis (World Health Organization Monograph
Series No. 6), Geneva, 1955

**TABLE I CLINICAL CLASSIFICATION OF BULBAR AND RESPIRATORY POLIOMYELITIS
INCIDENCE AND MORTALITY RATES IN 345 CASES**

Clinical groups	Principal site of anatomical lesion	Cases		Case mortality	
		number	per centage	number	per centage
A Polioencephalitis	encephalo bulbar	75	22	29	39
B Pharyngeal and/or laryngeal paralysis without encephalitis or cerebrale no peripheral paralysis	bulbar	12	4	3	25
C Paralysis of spinal respiratory muscles without encephalitis cerebrale or pharyngeal paralysis	spinal	157	45	48	30
D Paralysis of spinal respiratory muscles and of pharynx or larynx without encephalitis or cerebrale	spino bulbar	28	8	13	46
E Paralysis of spinal respiratory muscles with cerebrale but without true pharyngeal paralysis	spino (bulbar) cerebrale	60	17	39	65
F Paralysis of spinal respiratory muscles and of pharynx or larynx and with cerebrale	spino bulbar cerebrale	13	4	11	85
Totals		345	100	142	41

Outlining the different phases of this catastrophic epidemic Dr Lassen² describes the tragic situation that arose when thirty to

fifty patients a day of whom six to twelve were drowning in their own secretions poured into Blegdam Hospital which had at the time only one iron lung and six cuirass respirators

Lassen H C A. (1955) The management of respiratory and bulbar paralysis in poliomyelitis. In: Poliomyelitis Gene n. p. 157 (World Health Organization Monograph Series No. 26)

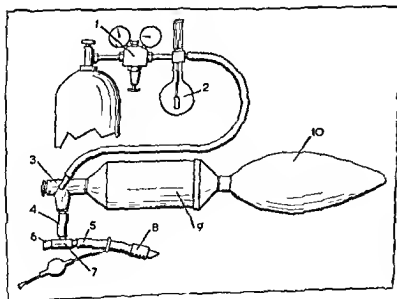


FIG 1 EQUIPMENT FOR BAG VENTILATION WITH CO₂ ABSORBER AND RUBBER CUFF TUBE

- 1 Reduction valve 2 humidifier
- 3 reduction valve 4 connexion
- 5 rubber tube 6 rubber stopper
- 7 connexion 8 cuff tube 9 absorber
- 10 rubber bag

An emergency treatment was introduced with the help of anaesthetists. This consisted of high tracheotomy with the introduction of an inflatable rubber cuff tube to prevent air from penetrating into the hypopharynx postural drainage and manual ventilation

and helped to reduce mortality from over 80% in August to 25% in December

Experience has shown that tank respirators are indicated for the so-called "dry" cases those without accumulation of secretions in the airway—i.e. for cases of pure spinal

FIG 2 BAG VENTILATION WITH ABSORBER



with a mixture of about 50% oxygen from a rubber bag (see fig 1 and 2). Though "neither new nor ideal" according to Dr Lassen, this method using manual bag ventilation proved of great value since modern equipment for mechanical respiration was limited. It made possible the transport of patients to treatment centres

respiratory insufficiency without bulbar involvement. On the other hand, they are contra-indicated for "wet" cases—those with the airway obstructed by secretions. In the latter, it is preferable to use the method outlined above: high tracheotomy with the insertion of an inflatable cuff tube to seal off the trachea and prevent aspiration of

**TABLE I CLINICAL CLASSIFICATION OF BULBAR AND RESPIRATORY POLIOMYELITIS
INCIDENCE AND MORTALITY RATES IN 345 CASES**

Clinical groups	Principal site of anatomical lesion	Cases		Case mortality	
		number	per centage	number	per centage
A Polioencephalitis	encephalo bulbar	15	22	29	79
B Pharyngeal and/or laryngeal paralysis without encephalitis or cerebrale no peripheral paralysis	bulbar	12	4	3	25
C Paralysis of spinal respiratory muscles without encephalitis cerebrale or pharyngeal paralysis	spinal	157	45	48	30
D Paralysis of spinal respiratory muscles and of pharynx or larynx without encephalitis or cerebrale	spino bulbar	28	8	13	46
E Paralysis of spinal respiratory muscles with cerebrale but without true pharyngeal paralysis	spino (bulbar) cerebrale	60	17	38	63
F Paralysis of spinal respiratory muscles and of pharynx or larynx and with cerebrale	spino bulbar cerebrale	13	4	11	84
Totals		255	100	142	41

Outlining the different phases of this catastrophic epidemic Dr Lassen³ describes the tragic situation that arose when thirty to

Lassen H C A (1945) *The management of respiratory and bulbar paralysis in poliomyelitis*. In: *Poliomyelitis* Geneva p 157 (World Health Organization Monograph Series No. 6)

fifty patients a day, of whom six to twelve were drowning in their own secretions poured into Blegdam Hospital which had at the time only one iron lung and six cuirass respirators

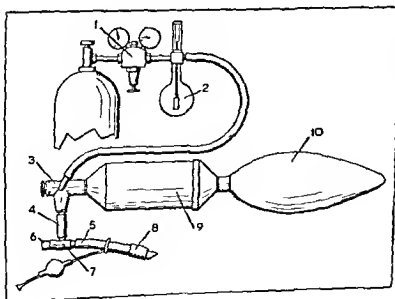


FIG 1 EQUIPMENT FOR BAG VENTILATION WITH CO₂ ABSORBER AND RUBBER CUFF TUBE

1 Reduction valve 2 humidifier
3 reduction valve 4 connexion
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7 connexion 8 cuff tube 9 absorber 10 rubber bag

should be employed and the tests used should have been studied to determine what conditions should be stipulated for acceptable agreement between the antigens. This control will enable unsatisfactory preparations to be eliminated.

Work is now in progress on the establishment of International Reference Preparations of sera from syphilitics in the form of freeze-dried sera with a view to obtaining a

common yard stick for the comparison also of the reactivity of different serological methods. The future availability of International Reference Preparations both for the major components of cardiolipin antigens and for sera from syphilitics is expected to provide a more uniform stable and comparative basis for serological testing for syphilis and other treponematoses in laboratories in all parts of the world.

THE 1954/55 INFLUENZA EPIDEMIC IN THE NORTHERN HEMISPHERE

Epidemiological information concerning the influenza epidemic of late 1954 and early 1955 has appeared regularly in the *WHO Weekly Epidemiological Record*. While it is still too soon to be able to present a complete picture, some idea of the nature and extent of this epidemic can be obtained from information assembled from the *Record* and from other data made available to WHO. It is from these sources that the following description of the outbreaks in various countries has been drawn.

The first epidemics in the Northern Hemisphere were reported in Wales and the north-east of England in October 1954. These original outbreaks affected schools and other communities in particular. At the end of the year and in January 1955 incidence increased among adults and the infection spread to most parts of the country. It receded in February. It was found that virus B was largely responsible although a few cases of influenza A were diagnosed in South Wales, the Midlands and London.

Towards the middle of December 1954 a number of cases were reported in Slovenia but it was not until January 1955 that outbreaks affecting communities especially were noted in other parts of Yugoslavia. The presence of influenza B was confirmed serologically. During the last week of February incidence increased in Zagreb and in the first week of March it also rose in Serbia particularly in Belgrade.

At the beginning of January 1955 Canada reported the beginning of an epidemic involving several hundred cases in the area around Calgary, Alberta. Virus B was identified. In the last week of the month the disease abated in this sector but an outbreak was noted in Ontario. This latter outbreak receded at the beginning of February while a new focus appeared in Nelson, British Columbia.

About 7 January the Netherlands were affected with an outbreak in Den Helder (northern Holland). By the middle of February influenza had spread throughout the rest of the country especially among children. There were a few deaths attributed to secondary staphylococcus pneumonia. The presence of type B virus was confirmed by virological and serological tests on sample cases from several provinces.

In the second half of January there was an increase in cases of rhinopharyngitis in the

Test	Cardiolipin	Lecithin	Cholesterol
Mazzini	0 025	0 20	0 75 up to 0 90 =
Meinicke	0 015	0 045	Tolu balsam 1 025
New York State	0 03	0 30	0 90
Rappaport Stained	Cardiolipin 0 20	1 30	Separate solution of cholesterol ^e
Rein Bossak	0 20	1 30	Separate solution of cholesterol ^e
Schmid	0 0315	0 2520	0 9450
Taniguchi	0 02	0 10	Separate suspension of colloidum
VDRL	0 03	0 21 ^d	0 90

^a Subject to standardization
^b Subject to standardization some laboratories have adopted 1 5 or 2 0 as fixed percentage
^c 1 / alcohol solution
^d Subject to standardization some laboratories have adopted 0 21 0 23 or 0 27 as fixed percentage

Not only has it been possible to obtain a higher sensitivity and specificity with antigens prepared from cardiolipin and lecithin than with those prepared from the old type of alcoholic extracts (lipoidal antigens) but also it is now easier to adjust an antigen to a certain level of sensitivity or specificity and to maintain for new batches a chosen level of reactivity. Some authors claim that a standard sensitivity is obtained only when preparations which have passed a certain chemical and serological test are used. Others state that a certain adjustment of the lecithin percentage is necessary to maintain a standard reactivity of the antigen even when the selected preparations of cardiolipin and lecithin are used.

The cardiolipin antigens have also made it possible for antigens for different tests to be compared on a more rational basis since these antigens can now be made from the same batches of cardiolipin, lecithins and cholesterol.

Of importance is the fact that cardiolipin antigens and the various lipoidal antigens react with a complex of antibodies called "reagin", and that this reagin is not identical with the antibody or group of antibodies

which react with the *Treponema pallidum* in tests such as the *Treponema pallidum* immobilisation test. Therefore, even with the best cardiolipin antigen, it is not possible to avoid reactions in some sera from persons who do not have syphilis or any other type of treponemal disease. This is because diseases or conditions other than the treponematoses may give rise to the appearance of antibodies which are more or less similar to those which make up the reagin. Nevertheless, false positive reactions in sera from cases of, for example, malaria and pneumonia are frequently avoided when cardiolipin antigens are used instead of lipoidal antigens. In sera from cases of leprosy, however, this is not so.

Serological testing of new preparations of cardiolipin and lecithins consists of a comparison of the new product with the International Reference Preparation established by the WHO Expert Committee on Biological Standardization. To assure, for instance, that a new cardiolipin is of the same reactivity as the International Reference Preparation which was produced in Albany and which is held by the Standards Department of the Statens Seruminstitut, Copenhagen, it is necessary to compare the reactivity of two antigens for the complement fixation test and of two antigens for the flocculation test. Each pair of antigens contains a reference antigen and a test antigen of the following composition:

	Cardiolipin	Lecithin	Cholesterol
Reference antigen	International Reference Preparation	International Reference Preparation	pure solution
Test antigen	New preparation	International Reference Preparation	same pure solution

The antigens should give agreeing results when used for testing different reactive and non reactive sera on several testing days. Both qualitative and quantitative testing

Reports of Expert Groups

LEGISLATION AFFECTING PSYCHIATRIC TREATMENT

Legislation concerning the mentally ill has not kept pace with advances in therapy. Although the concept of alienism or shutting the mental patient up in an asylum is gradually being replaced by that of illness with emphasis on treatment in psychiatric hospitals or by means of outpatient services, present legislation still tends to give more weight to legal than to medical considerations. Too seldom does it fulfil its true functions of enabling treatment and care to be given and at the same time of protecting the patient and society. Both admission to and discharge from a mental hospital are often rendered difficult and in its concern for protecting society legislation commonly fails to give due consideration to the liberty of the individual patient. Mental health legislation should be a help rather than an obstacle to psychiatric care: its aim should be to foster public responsibility for providing care for the mentally ill rather than to place checks on the mental patient and his physician.

The problem of what mental health legislation is and should be is the subject of the fourth report of the WHO Expert Committee on Mental Health¹. In preparation for the committee's discussions an extensive study of existing legislation was made.²

Essential requirements to be met

A primary requisite of legislation affecting psychiatric treatment is that it encourage the provision of treatment facilities without hampering progress in treatment and care. It is not enough to have psychiatric hospitals

there must also be some assurance that they be properly staffed and run. The report specifies therefore that the law should provide for the recruitment and training of specialized professional staff. Other essentials are the setting up of a specialized health service—i.e. a community psychiatric service—and the institution of measures permitting treatment of patients who are unaware of their condition or who are dangerous and ensuring guardianship and medical supervision when the patient's condition requires them.

The problem of the unwilling patient

Considerable space is devoted in the report to the problem of the unwilling patient since this is one of the chief points with which legislation concerning the mentally ill usually deals. It is emphasized that the better psychiatric services are the less need will there be for powers to compel patients to accept treatment.

The report describes the problem from the viewpoints of those concerned with compulsory treatment:

"To the physician the admission to hospital of a mental patient whose condition prevents his appreciating his need for treatment is a medical matter akin in some ways to an emergency surgical operation and in others to the isolation in the interests of his fellows of a patient suffering from an infectious disease."

"To the jurist, it is a matter of individual liberty and of the safeguards which the law must provide to protect it."

"To the citizen both these aspects are important."

Any law which deals with this subject should therefore attempt to recognize the needs of both medical treatment and legal safeguards.

¹ *M.H. & Cr. Crim. R. p. Sr. 1955 98*. 5 p. rev. Price £4.50 3d or Sw. £ 1.—Published in English, French, and Spanish.

² See p. 180 of the report of the Committee. The information in this study is based in part on material furnished for the Expert Committee meeting.

Federal Republic of Germany, especially in the Bremen Hamburg Lubeck area and mainly among children and young adults. The infection remained mild until the beginning February. An epidemic also developed in Hesse particularly in the Frankfurt Höchst region (from the middle of January) and at Wiesbaden (at the end of the month). The infection proved to be very contagious and affected 30% to 40% of schoolchildren in towns and more than 50% in rural areas. At the end of January, nearly 10% of the adults were also affected. From 16 to 22 January notifications increased in the south in Lower Franconia (Bavaria). During the first week of February, the epidemic spread to the Rhine area (except apparently for the left bank) the region of the Main Schleswig Holstein and Bavaria (Franconia) where the main focus seemed to be located. In the second half of February the infection receded in the north (Lower Saxony, North Rhine, Westphalia) after having affected nearly 15% of the population. At the beginning of March the situation improved in Hesse while morbidity continued to increase in the south east (Swabia Upper and Lower Bavaria). During these epidemics the presence of virus B was demonstrated by the complement fixation and Hirst methods. Virus A was also demonstrated in certain cases in the central and northern parts of the country.

Also in the second half of January a focus of influenza infection appeared in Helsinki (Finland) mainly affecting children. Among 20 000 schoolchildren under observation the absence rates for the weeks ending 22 January 29 January and 5 February rose successively from a normal level of 4.5% to 4.8% 19.5% and 25.4%. A strain of influenza virus was isolated which was

serologically related to the B strains isolated in England.

During the same period a relatively mild epidemic of influenza B was reported in Japan among primary schoolchildren of the prefectures of Chiba and Yamanashi (Honshu Island). At the beginning of February the disease spread to the primary schools of Tokyo and to several other prefectures of Honshu.

In the USA absences among the school children of Portland and the County of Multnomah Oregon increased from the beginning of February because of an unusual prevalence of respiratory infections. Reports received in mid February indicated a large number of cases of influenza like infections in Syracuse New York and in Maine.

In Austria notifications of cases of influenza increased rapidly from the first week of February and began to fall off in the second week of March in the greater part of the country, with the exception of the north east (Upper and Lower Austria and the region of Vienna).

Also during the first week of February influenza morbidity increased in Oslo Sweden and Switzerland. These outbreaks reached their maximum during the week ending 19 March.

Finally at the end of February outbreaks affecting principally children and young adults and reaching their peak in the first week of March began to appear in the centre and north of Sweden (districts of Örebro and Boden).

In summary the influenza epidemic of 1954/55 was mild causing relatively few deaths and was similar to previous epidemics which seem to have followed each other at intervals of two or three years since the great pandemic of 1918.

required is to give these patients facilities for treatment and the possibility of guardianship and medical supervision in accordance with their medical needs and social inadequacy. The different methods of solving these problems are extremely complex since

they must vary according to the social structure of each country. It would seem that preference should be given above all to establishing laws strongly integrated into cultural traditions while at the same time leaving the way open for possible changes."

ALCOHOL AND ALCOHOLISM

While the attention that WHO has drawn to alcoholism as a public health problem has given the needed incentive to action in a number of countries, there is still a tendency in many countries to deal with alcoholism on the social welfare level rather than within the framework of public health. Better comprehension of the physical and psychological nature of alcoholism, precise definition of terms and study of the drinking patterns in different countries are required if the problem is to be fully accepted as a matter of medical concern and to be dealt with effectively.

The report¹ of a WHO expert committee drawn from the Expert Advisory Panels on Mental Health and on Drugs Liable to Produce Addiction attempts to clarify basic ideas about the problems of alcohol through an exchange of knowledge and experience among psychiatrists, physiologists and pharmacologists. It also contains interesting observations on variations in drinking habits and the resulting differences in alcoholic behaviour.

"Craving" for alcohol

"Craving" and alternative terms such as "irresistible desire" or "need" have been used to explain drinking arising from a psychological need, the physical need to relieve withdrawal symptoms (see below) or a physical need which originates in physiological conditions involving the metabolism, endocrine functions, etc. and existing in the drinker before he starts on his "drinking career" or developing in the course of it.

However, there seem to be different mechanisms involved in different types of abnormal drinking and more precise terminology is desirable. It is suggested in the report that the condition which arises when a drinker at the termination of a drinking bout seeks to relieve withdrawal symptoms by the use of more alcohol be referred to as a "physical dependence" on alcohol. On the other hand, the mechanism which leads to a new bout after days or weeks of abstinence results from an accumulation of psychological tensions and may be referred to as "psychological dependence."

In all alcoholics, regardless of the reason for their alcoholism, there is a "weakening of that part of the higher personality from which the inhibition of primitive tendencies derives" and "the pathological desire for alcohol becomes more evident as the inhibiting forces weaken and ultimately fail."

Withdrawal symptoms

The symptoms which appear after cessation of drinking or after an abrupt decrease in the rate of intake of alcohol are referred to as "withdrawal symptoms." The kind and intensity of such symptoms seem to vary with the individual and to be correlated with the degree of intoxication and with the length of time over which this degree of intoxication has been maintained before cessation or reduction of the alcohol intake.

These symptoms may include—after comparatively short periods of continuous heavy drinking—tremor, weakness, perspiration, hyperreflexia, insomnia, anorexia, nausea, vomiting, diarrhoea, slight hypertension with postural hypotension and slight elevation

¹ *Wld Hlth Org. techn. R. p. Sr.* 1955, 94, 14 pages. Price 1/6 30/30 or 3/6 1/- Published in Engl., Fr., & Spa. etc.

Much existing legislation involves a judicial pronouncement for admission to a mental hospital but this creates a type of stigma which would better be avoided. A recent tendency is to permit compulsory admission on the joint request of a psychiatrist and a relative of the patient or some specified non judicial authority subject to judicial review after admission. Such a procedure may allow compulsory treatment for a period of 12 to 18 months and ensure that the majority of patients who recover under treatment will do so without having been detained in hospital by judicial order.

A means should be provided for a patient to appeal his case at any time after his involuntary admission. In most countries such an appeal would be to a judicial authority but it is beginning to be recognized that another type of "judging" body might be preferable such as a board composed of a physician a judge and a layman. The purpose of any body authorizing compulsory detention should be restricted to deciding on the legality of the detention and should not be concerned with certifying that a patient is insane or mentally subnormal.

The report points out that methods of discharge are particularly important as a safeguard against wrongful detention in a psychiatric hospital and that the power of discharge may rightfully rest with the patient's next of kin (subject to veto by the medical superintendent of the hospital) with the hospital superintendent or with a health authority local or central. Every effort should be made to eliminate the fear on the part of the public that once admitted to a mental hospital it is difficult to get out since such a fear makes people unwilling to seek treatment at an early stage of mental illness.

There are patients who in their own interest and that of their relatives need some form of compulsory supervision as part of treatment outside hospital. At present there is no psychiatric legislation providing for such compulsory supervision although a draft law containing a proposal of this type is under discussion in one country. It is recognized that medico social guardian

ship such as this would be possible only where well developed extramural psychiatric services are available, but it is recommended that this idea be considered by governments intending to institute or revise legislation concerning the mentally ill.

Organization of the psychiatric service

The report suggests how the various levels of a psychiatric service should be organized from the central authority to the local authority. The functions and responsibilities of these authorities are outlined.

Other problems

Brief consideration is given to the problems presented by certain categories of patients.

The mentally subnormal. General legislation governing the protection and education of children should meet the needs of mentally subnormal children as well. Mentally subnormal adults should be dealt with wherever possible on a voluntary basis. For neither is special legislation required.

Epileptics. No special legislation seems necessary if there is general legislation entitling all individuals to education and to working conditions suited to their abilities.

Alcoholics. There should be legislation which would make it possible for alcoholics who are dangerous to themselves or others to be obliged to submit themselves for treatment.

Legislative principles in relation to social structure

The report points out that the fundamental problems of psychiatric treatment and mental health are the same in all countries whatever their structure or degree of economic development but that the way in which these problems are dealt with must vary according to the type of social structure. The situation is summarized thus:

"the problems raised by the treatment and care of mental patients are relatively simple. What is

Another difference is in the comparative success of treatment. Although treatment of alcoholics may not achieve satisfactory and lasting results in every case the proportion of satisfactory results is much greater than among opiate addicts.

Still another difference between alcoholism and opiate addiction is the social attitude towards the two. alcoholic drinks are widely sold and consumed in public and their use is generally considered normal and is even sometimes encouraged whereas the sale of opiates is controlled or clandestine their administration is usually by injection their use always concealed and the condemnation

of society much greater than with regard to alcoholic excesses.

Disorders induced by alcohol

The report closes with a classification of disorders induced by the heavy use of alcoholic beverages and a discussion of the public health implications of these disorders. Alcoholism, it is emphasized, calls for "widespread action on the part of health authorities" with particular stress laid on the establishment of out patient services for early treatment and due attention being given to appropriate legal and social measures.

MIDWIFERY TRAINING

Variations in culture and in economic and social conditions give rise to corresponding variations in practices relating to pregnancy, childbirth and the newborn. Today efforts are being made in many parts of the world to improve maternal and child health services without abruptly disturbing the patterns set by traditional beliefs and practices. Changes are being brought about gradually through health education and the incorporation of maternity care into general health programmes.

A specific aspect of the improvement of services for pregnant women and for the newborn is the training of midwives and this is the subject of the report of a WHO expert committee.¹

The report first describes the types and functions of midwifery personnel (apart from physicians) classified into three broad groups: (1) traditional birth attendants who are still common in economically less-developed areas; (2) auxiliary midwives who have some training for their work; and (3) fully trained midwives including the trained midwife, the nurse midwife and the public health nurse midwife.

The level of the training which can be given must be adapted to the general education of the midwife recruit as well as to local conditions with the training programme developing towards a higher professional standard. For example plans for areas where the numbers of trained personnel are limited and the service is dependent on the traditional birth attendant should aim to improve the practice of the latter to prepare qualified midwives for training and supervising auxiliary midwives and to train auxiliary midwives.

A large section of the report is devoted to the preparation of the fully trained midwife and of the auxiliary midwife. The essential knowledge and skills are outlined, factors to be considered in the selection of students are suggested and the desirable training facilities and appropriate methods of teaching are described. It is specified that the student midwife should have experience under supervision in the complete maternity care (pre natal, delivery and post natal) of a minimum of twenty cases. The training of the midwife teacher is also discussed.

Attention is then turned to the traditional birth attendant whose influence in the community may be great and whose role important but whose training in technical

W.H.O. Org. J. 1955 33: 21 pages. Price 19 \$0.30 Sw. 1.1 Published in English, French, and Spanish.

of body temperature. Such symptoms usually last for only 24 to 72 hours. After a prolonged period of very heavy drinking (more than 30 days of continuous intoxication with amounts of alcohol sufficient to induce definite motor incoordination) withdrawal symptoms include the above in a more severe degree and in some drinkers, convulsions and mental disturbances ranging from hallucinations without loss of insight to typical delirium tremens.

Convulsions and delirium should be prevented or treated by appropriate means such as the administration of sedatives with gradual reduction of the amount over a period of days. Other disturbances such as nutritional deficiencies and water and electrolyte imbalance also require proper treatment.

Inability to stop drinking and 'loss of control'

Distinction is made in the report between inability to stop drinking and 'loss of control'. The former refers particularly to drinkers in wine drinking countries and in some of the 'beer drinking' countries who reach a stage at which they cannot withstand any periods of abstinence but do not lose the ability to regulate their alcoholic intake. Such behaviour may be attributed to either physical or psychological dependence or both. Loss of control seems to be a more appropriate expression for a different manifestation of alcoholic behaviour common in countries where alcoholic beverages are used predominantly in the form of distilled spirits and where drinking bouts commonly result in severe intoxication with the drinker losing control once drinking has started and being impelled to continue drinking on increasingly higher levels until stopped by external or internal factors. Such drinkers may however be able to refrain from drinking for weeks or even months.

Alcoholic amnesias ('blackouts')

Two types of amnesia may be associated with the ingestion of alcohol. The first may occur as one of the ordinary symptoms of

severe alcoholic intoxication. The second is a type which is observed in many countries among drinkers who have ingested relatively small amounts of alcohol and which cannot be accounted for by the pharmacological action of alcohol *per se*. The latter type sometimes referred to as palimpsests is reported with high frequency in the early stages of alcoholism in the USA, the Scandinavian countries, the Netherlands and the United Kingdom but seems to be somewhat rare in France and other viticultural countries except in association with the very late stages of alcoholism.

The reported geographical distribution of amnesic episodes suggests a possible explanation for them. It would seem that where the consumption of alcoholic beverages is well spread over the day and is taken in the form of wine or beer amnesic episodes are not liable to appear at the early stages of alcoholism even if the daily total alcohol intake is high but where distilled spirits are the common drink and the drinking of them is concentrated chiefly at certain times of the day the resulting quick changes in the blood alcohol level may precipitate the amnesia symptoms. A thorough study of early amnesic episodes is needed however before any conclusions can be drawn.

The position of alcohol in relation to drug addiction

It has been agreed that alcohol as a drug should be considered as intermediate between addiction producing and habit forming drugs. There are certain similarities between alcoholism and opiate addiction but important differences are also apparent. The severe withdrawal symptoms associated with alcoholism (e.g. convulsions or delirium) can be more dangerous to the life of the individual than any of the manifestations of withdrawal of morphine for example. On the other hand physical dependence on alcohol as manifested by withdrawal symptoms occurs after a longer period of 'ingestion' than is the case with dependence on morphine which can appear after administration of therapeutic doses over a period of 21 to 30 days.

been published in the *International Digest of Health Legislation*

It is now generally agreed that the aim of mental health legislation should be to provide facilities for early treatment and to make provision for the hospitalization of the mentally ill by procedures which are neither humiliating nor complicated yet which afford adequate safeguards against arbitrary detention. The principles underlying laws governing the admission of the mentally ill to hospital many of which are based on the French law of 1838 and the English act of 1890 may be summarized as follows: whereas under the French law a mental patient might be admitted to hospital on medical certification or by administrative order the English law permitted admission only by order of a judicial authority. One or the other of these two systems has been adopted by and forms the basis of the legislation of many countries.

At a later date in some countries very recently procedures for facilitating the admission of mental patients to hospital were introduced. The most radical innovation is voluntary admission which enables a patient to obtain early treatment without the stigma of certification and as he may usually leave the hospital at will affords him adequate protection against arbitrary detention. Provision is also made in certain countries of the British Commonwealth for temporary treatment without certification that is admission without the intervention of the judicial authorities. Special procedures for emergency admission and for admission for observation exist in most countries.

The admission procedures in use in the countries studied are examined in this survey under the headings voluntary admission involuntary admission (admission on medical certification admission on judicial order admission on administrative order) emergency admission and admission for observation.

The hospitalization of special categories

of mental patients such as mental defectives epileptics drug addicts and alcoholics offenders and prisoners and sexual psychopaths for whom provision is also made in certain countries is dealt with in the second half of the survey. Certain of these categories pose very complicated problems. For example the classes of persons included in the category of mental defectives vary markedly from country to country and the nature of the mental disorder from which they suffer is such that the legal provisions applying to them are to be found not only in mental health legislation but also in enactments relating to education penal codes etc.

Then follow sections dealing with family care and with trial leave the latter often taking the form of boarding-out with a selected family. These arrangements which apply both to the mentally ill and the mentally defective are of help in assisting patients to re adapt themselves to community life.

Arbitrary detention and refusal to release which have long been a recurrent theme in the more sensational type of literature are dealt with in a further section devoted to safeguards. Although a formal admission procedure may be considered *per se* a means of ensuring that patients are not arbitrarily committed to or detained in mental hospitals most law makers have provided additional safeguards by including provisions enabling a patient or his relatives or the authorities which ordered admission to apply for discharge at any time requiring superintendents of mental hospitals to notify the judicial or administrative authorities of every admission and to send reports on each patient at regular intervals during his stay in the hospital and prescribing the inspection of mental hospitals by certain designated authorities. An appeal against refusal to release may also be made in most countries.

The final section of the survey deals with *tenderies* in draft laws and regulations. Six tables containing an outline of the main provisions governing the hospitalization of the mentally ill in the countries studied are included in an appendix.

1. *Int. Hlth. L.* 1955 6 1100. The study is too small a sample (Price 4/9 5/- 5/- 4/-). Published in English and in French.

matters may present difficulties because of her lack of schooling. Simpler teaching methods have to be used. The most effective type of teaching is probably well supervised, in-service training given by a qualified midwife.

Since the quality of midwifery practice is an important factor in the success of health services—of maternity care programmes in particular—regulation by law of midwifery training and practice is recommended. Such legislation designed to protect the patient

(mother and newborn) and the attendant should provide for maintenance of adequate standards of training and examination, regulation and supervision of practice and protection of the title and status of the midwife.

The report stresses that no general programme for training midwives can be specified: each country must plan and develop a programme to meet its own needs, taking into account local conditions and the type of personnel to be trained.

BIOLOGICAL STANDARDIZATION

The eighth report of the Expert Committee on Biological Standardization¹ records the establishment of International Standards and Reference Preparations for a number of substances: Schick Test Toxin (Diphtheria), *Clostridium welchii* (*perfringens*) Antitoxins

Type B and Type D Swine Erysipelas Serum, Anti-N Purified Protein Derivative of Avian Tuberculin, Thyrotrophin, Protamine and the melanin trypanocides Mel B and MSB. International Units were assigned by the Committee to some of these newly established standards and reference preparations and also to the International Standard for Anti-Q Fever Serum which was established last year.

¹ 16th Hlth Org. Techn. Rep. Ser., 1955, 96, 19 pages. Fr. 4, 1/9, \$0.30 or Sw. fr. 1.—Published in English, French and Spanish.

Health Legislation

COMPARATIVE STUDY: THE HOSPITALIZATION OF MENTAL PATIENTS

The laws and regulations governing the hospitalization of the mentally ill vary from country to country. Most existing legislation, however, is still inspired by the principles that underlay laws enacted in many instances more than a hundred years ago. A certain number of countries have recently established commissions or committees to examine and revise their national legislation in the light of modern psychiatric knowledge. The fourth session of the WHO Expert

Committee on Mental Health held in Geneva from 1 to 6 November 1954, was devoted to an examination of the principles that should govern legislation affecting psychiatric treatment.¹ Thus a survey of the admission procedures in use in various countries is topical, such a survey covering the mental health legislation at present in force in more than thirty countries has just

¹ See p. 8, 175 of this number of the *CA* and *fr*.

than eighty zoonoses established by the Joint WHO/FAO Expert Group on Zoonoses in 1950¹. Thirteen medical and veterinary experts attended the meeting of which Professor A. Stampar (Zagreb) was Chairman.

Inauguration of United Kingdom Committee for WHO

The United Kingdom Committee for the World Health Organization held its inaugural public meeting at the London School of Hygiene and Tropical Medicine on 5 April 1955. This committee following the pattern of similar groups in some other countries² has been established to inform the general public about WHO. Its acting executive secretary is Miss Olive Baggallay, former Chief of the Nursing Section at WHO Headquarters.

Sir Allen Daley, chairman of the provisional committee, opened the meeting. An address was given by Miss Patricia Hornsby Smith, M.P., who speaking on behalf of the Minister of Health, noted Great Britain's support of the World Health Organization and reviewed the Organization's work. Other speakers were Professor J. M. MacKintosh, who also described WHO's activities and contributions to health in all parts of the world, and Professor G. MacDonald, who dealt particularly with the role played by the Organization in improving health in the tropics.

Post Graduate Course in Occupational Health

A post graduate course in occupational health was given from 9 to 28 May under the auspices of the Ministère de la Santé publique et de la Population and the Ministère du Travail of France at the Ecole nationale

de Santé publique in Paris. The Institut de Médecine du Travail of the University of Paris, the ILO and WHO all collaborated in this course. The participants, numbering thirty, were all physicians engaged in occupational health work, about half of them were holders of WHO fellowships and came from countries other than France. Three of the lecturers were provided by WHO. The course, the first of its kind, included visits to factories and other institutions.

Non Proprietary Names for Addiction Producing Drugs

In a circular letter to Member States, the Director General has proposed that governments take steps to facilitate the establishment of non proprietary names for addiction producing drugs. Specifically he has suggested that at the same time as it transmits a notification under the international Narcotics Conventions to the Secretary General of the United Nations, a government should also send to the Director General of the World Health Organization information concerning such a notification together with suggested international non proprietary names for the substance or substances in question.

This proposal arose from a resolution of the Economic and Social Council at its eighteenth session to the effect that it would be highly desirable in the interests of ensuring effective narcotics control for the existing slow process for the establishment of international non proprietary names for newly developed narcotics to be simplified and speeded up as much as possible. Acting on this resolution, the WHO Expert Committee on Drugs Liable to Produce Addiction in its fifth report set forth the proposal which the Director General has now transmitted to Member States.

See *W.H.I.H. Org. rev.* 1951, 40, Ann. 1
See, for example, *Ch. on W.H.I.H. Org.* 1954, 304.

Notes and News

Seminars on the Teaching of Preventive Medicine

The Pan American Sanitary Bureau which acts as WHO Regional Office for the Americas is organizing two seminars on the teaching of preventive medicine. All the 75 medical schools in Latin America are expected to participate in these seminars. The first planned for autumn 1955 will include medical school deans and professors from Argentina Bolivia Brazil Chile Paraguay Peru Uruguay and Venezuela. The second to be held early in 1956 will include representatives from Colombia, Cuba Dominican Republic Ecuador El Salvador Guatemala Haiti Honduras Mexico Nicaragua and Panama.

The general purpose of the seminars is to promote the interchange of ideas and experience among deans and professors of preventive medicine in the training of doctors. The subjects to be discussed are (1) programme and methods of teaching preventive medicine (2) organization of the department of preventive medicine and the formation and functions of the faculty (3) relationships with other departments of the school of medicine and (4) the role of the department of preventive medicine in the activities of public health services and vice versa.

Two special consultants are working with regular staff members of the Bureau on the preparation of the seminars in which they will also participate—Dr Abraham Horwitz, Sub-director of the National Health Service of Chile and Director on leave of absence of the School of Public Health of the University of Chile and Dr Guillermo Arbona, Professor and Head of the Department of Preventive Medicine at the University of San Juan, Puerto Rico.

Training Course for Public Health Officers and Veterinarians

The third group-training course for public health officers and veterinarians from Denmark Finland Iceland, Norway and Sweden will be given from 1 August to 30 September 1955 in Göteborg, Sweden. WHO furnishes lecturers and fellowships for these courses which began in 1953.

Among the subjects taught this year will be physiological hygiene, nutrition, occupational health and accident prevention.

Public Health Course in Turkey

For the third year in succession WHO is providing assistance for the Public Health Training Course held at the School of Public Health in Ankara. The course is intended for Turkish provincial and district health officers and will be taking place this year from 1 August to 1 November. WHO provides the services of foreign lecturers in various subjects: epidemiology, parasitology, environmental sanitation, health education, hospital administration and preventive medicine.

Meeting on Veterinary Public Health

From 6 to 10 June 1955 the Regional Office for Europe convened in Geneva an Advisory Group on Veterinary Public Health. The purposes of the meeting were to advise the Regional Office on its future programme in veterinary public health, to examine a number of current problems in Europe (particularly those relating to rabies, brucellosis, bovine tuberculosis and hydatidosis) and to consider possible revision of the list of more

International Non-Proprietary Names

In accordance with paragraph 7 of the Procedure for the Selection of Recommended International Non-Proprietary Names for Pharmaceutical Preparations¹ notice is hereby given that the following are selected as recommended international non-proprietary names.

The inclusion of a name in this list does not imply any recommendation for the use of the substance in medicine or pharmacy.

RECOMMENDED INTERNATIONAL NON-PROPRIETARY NAMES (*Rec INN*) LIST 1

*Recommended International
Non-Proprietary Name*
(Latin, English)

Chemical Name or Description

acebrocholum	acetodibromodihydrocholesterol
acebrochol	
acetaminosalolum	acetyl-4-aminophenyl salicylate
acetaminosalol	
acidum aminoaceticum	amino-acetic acid, glycocoll
amino-acetic acid	
acidum dehydrocholicum	
dehydrocholic acid	
acidum gentisicum	5-hydroxysalicylic acid
gentisic acid	
acidum glutamicum	glutamic acid
glutamic acid	
acidum iopanoicum	3-(3-amino-2,4,6-trimodophenyl)-2-ethylpropanoic acid
iopanoic acid	
acniflavinichloridum	mixture of the hydrochlorides of 3,6-diamino-10-methylacridinium
acniflavinium chloride	chloride and 3,6-diamino-acridine
aethacridinum	2-ethoxy-6,9-diaminoacridine
ethacridine	
aethinyloestradiolum	17-ethinyl-17-dihydroxy- Δ -13,5-oestratriene
ethinyloestradiol	
aethoxazorutosidum	monomorpholylethylurioside
ethoxazorutoside	
alcoholum benzylcum	phenylcarbinol
benzyl alcohol	
aldisulfonum natrium	disodium salt of 4,4'-diaminodiphenylsulfone formaldehydesulfo-
aldisulfone sodium	xylic acid
allobarbitalum	5,5-diallylbarbituric acid
allobarbital	
alloeupreidum natrium	sodium cuproallylthioureidobenzoate
alloeupreide sodium	
allomethadonum	3-allyl-5-methyloxazolidine-2,4-dione
allomethadone	

¹ See *U.S. Rev. Nat. Hlth. Org.* 1955: 60-5.

Review of WHO Publications

Cardiolipin Antigens Preparation and Chemical and Serological Control By Mary C Pangborn J O Almeida F Maltaner, A M Silverstein & W R Thompson Geneva 1955 (*World Health Organization Monograph Series* No 6, second edition) 52 pages Price 6/9 \$1.25 or Sw fr 4.-

This, the second edition of a monograph originally prepared for WHO in 1951 by the Division of Laboratories and Research New York State Department of Health, Albany, N.Y. brings up to date information on the preparation and control of antigens which have done much to improve the sensitivity and specificity of serological tests for the treponematoses. The publication of this revised edition has been necessitated by important developments which have taken place since the monograph originally appeared. Technical progress has been realized in the purification of cardiolipin, and a simplified method for complement fixation and for calculation of the 50% units has been evolved. In addition it has been found desirable to clarify the text at several points and to omit the New York State Department of Health Microscopic Slide Test which is no longer being recommended for use in the assay of new lots of antigen components.

Material for this revised edition has been compiled and prepared by three of the original authors, Mary C Pangborn

F Maltaner, and W R Thompson in co-operation with J O Almeida and A M Silverstein all of the Division of Laboratories and Research of the New York State Department of Health.

The first two chapters written by Dr Pangborn cover in detail the methods of preparing the antigens (including the preliminary extraction of cardiolipin and lecithin from beef heart the purification of cardiolipin and the purification of lecithin from both fresh eggs and beef heart) and the chemical analysis of the components of the antigens. The last chapter prepared by the other four authors deals with the serological examination of cardiolipin antigens giving specific directions for determining the optimal proportions in which cardiolipin lecithin and cholesterol must be mixed to give acceptable sensitivity and specificity in particular serodiagnostic tests. The changes in procedures in this new edition are according to the authors, aimed primarily at simplification of the actual performance of the tests and of the evaluation of results rather than at any important alteration in the results that would be obtained or in consequent decisions to accept or to reject an antigen component in question.

An annex, by W R Thompson on direct probability sequential analysis and a bibliography complete the monograph.

Statistical Information

A recent number of the *Epidemiological and Vital Statistics Report* (1955 vol 8 No 4) contains tables on mortality from Hodgkin's disease and from leukaemia and aleukaemia giving the number of deaths in certain countries from the beginning of the century a breakdown by sex and age of the data for certain countries for the years 1949-53 (depending on the country) and the mean annual mortality rates by sex and age group per 100 000 of the population in certain countries for 1950-2.

Also included in this number are statistics on cases of and deaths from various forms of dysentery (bacillary and amoebic) in a number of countries for the period 1946-54.

chloromaphazinum	2,2-dichlorodiethyl β -naphthylamine
chloromaphazine	
chloropynlenum citras	Λ N-dimethyl N-(2-pyridyl)-N-(5-chloro-2-thienyl) ethylenediamine citrate
chloropynlenum citrate	
chlorquinaldolum	5,7-dichloro-8-hydroxy 2-methylquinoline
chlorquinaldol	
cinchocainii chloridum	hydrochloride of the β -diethylaminoethylamide of 2-butyloxy cinchoninic acid
cinchocainum chloride	
cinchophenium	2-phenylquinoline-4-carboxylic acid
cinchophen	
cocarbonylasum	pyrophosphoric ester of thiamine
cocarbonylase	
corticotrophinum	adrenocorticotrophic hormone
corticotrophin	
cyanocobalamnum	vitamin B ₁₂
cyanocobalamum	
cyclobarbitalum	5-(1-cyclohexenyl)-5-ethylbarbituric acid
cyclobarbitol	
cyclopentaminum	Λ - α -dimethylcyclopentylethylamine
cyclopentamine	
cyclopropanum	
cyclopropane	
decamethonium	decamethylene 1,10-bis(trimethylammonium)
decamethonium	
diaphenylsulfonum	4,4'-diaminodiphenylsulfone
diaphenylsulfone	
dichlorophenarsini hydrochloridum	3-amino-4-hydroxyphenyl dichlorarsine hydrochloride
dichlorophenarsine hydrochloride	
d-ethylcarbamazinum	1-diethylcarbamoyl-4-methylpiperazine
diethylcarbamazine	
digitoxosidum	one of the heterosides of the leaf of <i>Digitalis purpurea</i> L.
digitoside	
dihydrostreptomycinum	
dihydrostreptomycin	
dihydrota-hysterolum	
dihydrotachysterol	
diiodohydroxyquinolinum	8-hydroxy 5,7-diiodoquinoline
diodohydroxyquinoline	
dimenhydrinatum	2-(diphenylmethoxy)- Λ N-dimethylethylammonium 8-chloro-theophyllinate
dimenhydrinate	
dimercaptolum	2,3-dimercaptopropanol
d-mercaptol	
dimethiodalum natrium	sodium diiodomethanesulfonate
dimethiodal sodium	
dimethyltubocurarii chloridum	
dimethyltubocurarium chloride	

aminoethylis nitras	nitrate ester of aminoethanol
aminoethyl nitrate	
aminothiazolum	
aminothiazole	
amodiaquini hydrochloridum	7-chloro-4-(3 diethylaminomethyl-4 hydroxyanilino) quinoline
amodiaquime hydrochloride	dihydrochloride dihydrate
antazolimi hydrochloridum	2 N benzylanilinomethylimidazoline hydrochloride
antazoline hydrochloride	
aprobarbitalum	allylisopropylbarbituric acid
aprobarbital	
aurothioglycanidum	auriomercaptoacetanilide
aurothioglycanide	
azameithoni bromidum	3 methyl 3 azapentane 1 5 bis (ethyl dimethyl ammonium) bromide
azamethonium bromide	
bacitracinum	
bacitracin	
benethamini penicillinum	benzylpenicillin salt of N benzyl β phenylethylamine
benethamine penicillin	
benzalkonii chloridum	mixture of alkylbenzyl dimethylammonium chlorides
benzalkonium chloride	
benzethoni chloridum	benzyl dimethyl p (1 1 3 3 tetramethylbutyl) phenoxyethoxyethyl
benzethonium chloride	ammonium chloride
benzododecinum	dimethylbenzyl dodecyl ammonium
benzododecinium	
benzoestrolum	3-ethyl 2 4-bis (p hydroxyphenyl) hexane
benzoestrol	
benzpyrini bromidum	1 benzyl 3 (dimethylcarbamoyloxy) pyridinium bromide
benzpyrinium bromide	
bibrocatholum	bismuth derivative of tetrabromopyrocatechol
bibrocathol	
camphotamidum	camphosulfonyl N methylpyridine β diethyl-carbonamide
camphotamide	
caramipheni chloridum	diethylaminoethyl 1 phenylcyclopentane 1-carboxylate hydrochloride
caramiphenium chloride	
carbromalum	α bromo- α -ethylbutyrylurea
carbromal	
cetobemidonum	4 m hydroxyphenyl 1 methyl-4 propionoyl piperidine
ketobemidone	
cetrimonium	cetyltrimethylammonium
cetrimonium	
cetylpyridini chloridum	
cetylpyridinium chloride	
chloramphenicolum	D() threo 1 p-nitrophenyl 2 dichloroacetamido 1 3 propanediol
chloramphenicol	
chlorazodinum	α azo-bis(chloroformamidine)
chlorazodin	

hydralazinium	1 hydrazinophthalazine
hydralazine	
hydrocodoni bitartras	dihydrocodeinone acid tartrate
hydrocodone bitartrate	
hydromorphone hydrochloridum	dihydromorphone hydrochloride
hydromorphone hydrochloride	
hydroxyprocainum	diethylaminoethanol 4-aminosalicylate
hydroxyprocaine	
hydroxypyridini tartras	tartrate ester of 3 hydroxypyridine
hydroxypyridine tartrate	
hydroxytetracainum	2-dimethylaminoethanol 4-n butylamino-salicylate
hydroxytetracaine	
ibrotamidum	ethylisopropyl- α bromacetamide
ibrotamide	
iodetrium	ethyl duodostearate
iodetyl	
iodophthalcinum natrium	disodium salt of tetraiodophenolphthalein
iodophthalein sodium	
iodothiouracilum	4-hydroxy 5 iodo-2 mercaptopyrimidine
iodothiouracil	
ipronazidum	1 isonicouyl 2 isopropylhydrazide
ipronazid	
isomethadonum	6-dimethylamino-4 4-diphenyl 5-methyl 3-hexanone
isomethadone	
isoprenalinum	1-(3 4 -dihydroxyphenyl)-2 isopropylamino-ethanol
isoprenaline	
khellinum	5 8-dimethoxy 3 methyl-6 7 furano-chromone extracted from the fruits of <i>Annua visnaga</i> (L.) Lam
khellin	() 3-methoxy N methylmorphinan
levomethorphanum	maleyl p-aminophenylsulfonamidothiazole
levomethorphan	
maleylsulfathiazolum	β -dimethylaminoethyl p-methoxybenzhydriyl ether
maleylsulfathiazole	
medrylaminum	1,2-dihydroxy 3-(2 methylphenoxy)-propane
medrylamine	
mephesisinum	N p-methoxybenzyl N N dimethyl N ' pyridylethylenediamine
mephesisin	
mepyraminum	mixture of methoxyoxymercuripropyl-succinylurea and theophylline
mepyramine	
meralluridum	disodium salt of 2,7-dibromo-4-hydroxy mercurifluoresceine
meralluride	
merbrominum	β -mercaptoethylamine
merbromin	
mercaptaminum	disodium salt of N-(3-carboxymethylmercapto-mercury-2-methoxy)- propylcamphoric acid
mercaptamine	
mercaptomerinum	
mercaptomerin	

dimoxylum phosphas	6,7-dimethoxy-1-(4-ethoxy-3-methoxybenzyl)-3-methylisouquinolium phosphate
dimoxylum phosphate	
diperodon hydrochloridum	3-(1-piperidyl)-1,2-propanediol dicarbamate hydrochloride
diperodon hydrochloride	
diphenanum	4-benzylphenyl carbamate
diphenan	
diphenhydramini hydrochloridum	β -benzhydryl-2-dimethylaminoethyl ether hydrochloride
diphenhydramine hydrochloride	
diprophyllum	dihydroxypropylthecophylline
diprophylline	
disulfiramum	tetraethylthiuram disulfide
disulfiram	
dixanthogenum	diethyl-dixanthogen
dixanthogen	
doxylaminii succinas	2-[α -(2-dimethylaminoethoxy)- α -methylbenzyl]pyridine succinate
doxylaminium succinate	
eucatropinum	4-hydroxy-1,2,2,6-tetramethylpiperidine phenyl glycolate
eucatropine	
fumagillinum	an antibiotic substance produced by certain strains of <i>Aspergillus fumigatus</i>
fumagilin	
furfurethoni iodium	furfuryltrimethylammonium iodide
furfurethonium iodide	
glucosulfamidum	glucose sodium bisulfite compound of sulfanilamidomethanol
glucosulfamide	
glucosulfonum	<i>p,p'</i> -diaminodiphenylsulfone <i>N,N</i> -di-(glucose sodium sulfonate)
glucosulfone	
gonadotrophinum chorionicum	contains the gonad stimulating substance obtained from the urine of pregnant women
chorionic gonadotrophin	
gonadotrophinum sericum	contains the follicle stimulating substance obtained from the serum of pregnant mares
serum gonadotrophin	
gramicidinum	
gramicidin	
heptaminolum	2-amino-6-methylheptan-6-ol
heptaminol	
hexachlorophenum	di-(2-hydroxy-3,5,6-trichlorophenyl) methane
hexachlorophene	
hexamethonium	hexamethylene 1,6-bis-trimethylammonium
hexamethonium	
hexobarbitalum	5-(1-cyclohexenyl)-1,5-dimethyl barbituric acid
hexobarbital	
hexoestrolum	3,4-di-(<i>p</i> -hydroxyphenyl)- <i>n</i> -hexane
hexoestrol	
homatropini methylbromidum	
homatropine methylbromide	
hyaluronidasum	enzymes of various origins which depolymerize hyaluronic acid
hyaluronidase	

natru ascorbas	
sodium ascorbate	
natru aurothiomalas	mainly the sodium salt of aurothiomalic acid
sodium aurothiomalate	
natru cyclamas	sodium cyclohexylsulfamate
sodium cyclamate	
natru dehydrocholas	
sodium dehydrocholate	
natru gentisas	sodium 5-hydroxyisosalicylate
sodium gentisate	
natru morrhuas	the sodium salts of the fatty acids of cod liver oil
sodium morrhuate	
natru stibogluconas	sodium antimonylgluconate
sodium stibogluconate	
natru tetradecylis sulfas	sodium 7-ethyl 2 methylundecyl-4-sulfate
sodium tetradecyl sulfate	
nicophol num	morpholine nicotinic acid amide
nicopholine	
nitrosulfathiazolum	2-(<i>p</i> -nitrophenylsulfonamido) thiazole
nitrosulfathiazole	
octamylaminum	isoamylaminomethylheptane
octamylamine	
oxapropani iodidum	1-dimethylaminomethylene 2,3-dioxopropane iodomethylate
oxapropanium iodide	
oxophenarsini hydrochloridum	3 amino-4-hydroxy phenyl arsenoxide hydrochloride
oxophenarsine hydrochloride	
oxycodoni hydrochloridum	dihydrohydroxycodeinone hydrochloride
oxycodone hydrochloride	
oxydipentoni chloridum	3,5 bis(trimethylammonium)dipentyl ether dichloride
oxydipentonium chloride	
oxyphenoni bromidum	diethyl 2(hydroxyethyl)methylammonium bromide α phenyl- α -cyclohexylglycolate
oxyphenonium bromide	
oxytetracyclinum	an antibiotic substance produced by the growth of <i>Streptomyces rimosus</i> or the same substance produced by any other means
oxytetracycline	
paramethadionum	3 5-dimethyl 5-ethylisoxazolidine 2 4-dione
paramethadione	
parethorycaium	diethylaminoethanol 4-ethoxybenzoate
parethorycaine	
paroxypropionum	4-hydroxypropioophenone
paroxypropione	
pentacetrithyl tetranitras	
pentacetrithyl tetranitrate	
pentamethon um	pentamethylene 1,5-bis(trimethylammonium
pentamethonium	
pentamid num	<i>p p</i> -diam dimo-diphenoxy pentane
pentamidine	

mercuderamidum	hydroxymercuripropylamide of <i>o</i> -carboxyphenoxyacetic acid
mercuderamide	
mercurobutolum	4 <i>tert</i> butyl 2-chloromercuriphenol
mercurobutol	
mereurophyllinum	mixture of the sodium salt of the β methoxy γ hydroxymercuri
mercurophylline	propylamide of trimethylcyclopentanedicarboxylic acid and theophylline
metaraminol bitartras	(-) 1 <i>m</i> hydroxyphenyl 2 amino-1 propanol hydrogen (+) tartrate
metaraminol bitartrate	
methacholinii chloridum	acetyl β methylcholinium chloride
methacholinum chloride	
methandriolum	17 α methyl 3 β 17 β dihydroxyandrostene 5
methandriol	
methaphenilenum	<i>N N</i> dimethyl <i>N</i> phenyl <i>N</i> (2 thienylmethyl) ethylenediamine
methaphenilene	
methapyrilenum	<i>N N</i> dimethyl <i>N</i> (2 pyridyl) <i>N</i> (2 thienyl) ethylenediamine
methapyrilene	
metharbitalum	5 5 diethyl 1 methyl barbituric acid
metharbitol	
methenaminii tetraiodidum	hexamethylenetetraminium tetraiodide
methenaminium tetraiodide	
methenaminum	hexamethylenetetramine
methenamine	
methestrolu dipropionas	4 4 (1 2 diethylethylene)di- <i>o</i> -cresol dipropionate
methestrol dipropionate	
methiodalum natricum	sodium iodomethanesulfonate
methiodal sodium	
methylbenzethonii chloridum	benzyl dimethyl 2 [2 (<i>p</i> 1 1 3 3 tetramethyl butyl-cresoxy) ethoxy]
methylbenzethonium chloride	ethylammonium chloride
methylergometrinii tartras	D lysergic acid 2 butanolamide tartrate
methylergometrinium tartrate	
methylphenobarbitalum	<i>N</i> methyl 5-ethyl 5 phenylbarbituric acid
methylphenobarbital	
methylrosanilini chloridum	crystal violet
methylrosanilinium chloride	
methylthionini chloridum	tetramethylthioninium chloride
methylthioninium chloride	
methylthiouracilum	4 methyl 2 thiouracil
methylthiouracil	
monoethanolaminu oleas	
monoethanolaminum oleate	Δ allylnormorphine
nalorphinum	
nalorphine	2 (1 naphthylmethyl) imidazoline
naphazolinum	
naphazoline	

<i>natru ascorbas</i> sodium ascorbate	
<i>natru aurothiomalas</i> sodium aurothiomalate	mainly the sodium salt of aurothiomalic acid
<i>natru cyclamas</i> sodium cyclamate	sodium cyclohexylsulfamate
<i>natru dehydrocholas</i> sodium dehydrocholate	
<i>natru gentisas</i> sodium gentisate	sodium 5-hydroxyascylate
<i>natru morrhuas</i> sodium morrhuate	the sodium salts of the fatty acids of cod liver oil
<i>natru stiboglucenas</i> sodium stibogluconate	sodium antimonygluconate
<i>natru tetradecylis sulfas</i> sodium tetradecyl sulfate	sodium 7-ethyl 2-methylundecyl-4-sulfate
<i>nicopholinum</i> nicopholine	morpholine nicotine acid amide
<i>nitrosulfathiazolum</i> nitrosulfathiazole	4-(<i>p</i> -nitrophenylsulfonamido) thiazole
<i>octamylaminum</i> octamylamine	isooctylaminomethylheptane
<i>oxapropanii iodidum</i> oxapropanium iodide	1-dimethylaminomethylene 2,3-dioxypropane iodomethylate
<i>oxophenarsini hydrochloridum</i> oxophenarsine hydrochloride	3-amino-4-hydroxy phenyl arsenoxide hydrochloride
<i>oxycodonii hydrochloridum</i> oxycodone hydrochloride	dihydrohydroxycodone hydrochloride
<i>oxydipentonii chloridum</i> oxydipentonium chloride	5,5-bis(trimethylammonium)dipentyl ether dichloride
<i>oxyphenonii bromidum</i> oxyphenonium bromide	diethyl- (hydroxyethyl)methylammonium bromide & phenyl- α -cyclohexylglycolate
<i>oxytetracyclinum</i> oxytetracycline	an antibiotic substance produced by the growth of <i>Sireptomycetes imosus</i> or the same substance produced by any other means
<i>paramethadionum</i> paramethadione	3,5-dimethyl 5-ethylloxazolidine 2,4-dione
<i>parethoxycainum</i> parethoxycaine	diethylaminopropanol 4-ethoxybenzoate
<i>paroxypropionum</i> paroxypropione	4-hydroxypropio-phenone
<i>pentacetrithyli tetranitras</i> pentacetrithyl tetranitrate	
<i>pentamethonium</i> pentamethonium	pentamethylene 1,5-bis(trimethylammonium)
<i>pentamidinum</i> pentamidine	<i>p-p</i> -diam-dino-diphenoxy-pentane

pentobarbitalum	5-ethyl 5 (1 methylbutyl) barbituric acid
pentobarbital	
phenacetimidum	phenylacetylurea
phenacetimide	
phenadoxonum	6-morpholino-4-diphenylheptan-3-one
phenadoxone	
phenicarbazidum	phenylsemicarbazide
phenicarbazide	
phenindaminum	2-methyl-9-phenyl-2,3,4,9-tetrahydro-1-pyridindene
phenindamine	
pheniodolum natrium	sodium α -phenyl β -(4-hydroxy-3,5-diiodophenyl) propionate
pheniodol sodium	
phenododecinum	dodecyl dimethyl-2-phenoxyethylammonium
phenododecinum	
phenothiazinum	
phenothiazine	
phentolaminum	2-(<i>m</i> -hydroxy- <i>N</i> - <i>p</i> -tolylanilino)methyl-2-imidazoline
phentolamine	
phenylbutazonum	3,5-dioxo-1,2-diphenyl-4- <i>n</i> -butylpyrazolidine
phenylbutazone	
pholcodinum	morpholinylethylmorphine
pholcodine	
pholedrinum sulfas	β -(<i>p</i> -hydroxyphenyl) isopropylmethylammonium sulfate
pholedrinum sulfate	
phthalylsulfathiazolum	(<i>o</i> -carboxybenzoyl)- <i>p</i> -aminophenyl sulfonamido-thiazole
phthalylsulfathiazole	
piperocainum chloridum	3-benzoyl-1-(2-methylpiperidino) propane hydrochloride
piperocainum chloride	
piperoxani hydrochloridum	2-(1-piperidylmethyl)-1,4-benzodioxan hydrochloride
piperoxan hydrochloride	
piridocainum	β -(2-piperidyl) ethyl <i>o</i> -aminobenzoate
piridocaine	
pregnenololum	3-hydroxy-20-keto pregnene-5
pregnenolone	
primaquinum	8-(4-amino-1-methylbutylamino)-6-methoxyquinoline
primaquine	
probarbitalum natrium	sodium derivative of 5-ethyl 5-isopropylbarbituric acid
probarbital sodium	
procainamudum	4-amino-(2-diethylaminoethyl) benzamide
procainamide	
procyclidinum	1-phenyl-1-cyclohexyl-3-pyrrolidino propan-1-ol hydrochloride
procyclidine	
promethazinum hydrochloridum	(dimethylamino-2-methyl-2-ethyl)- Δ -dibenzoparathiazine hydrochloride
promethazine hydrochloride	
propamidinum	α - ω -(4,4-diaminodiphenoxy) propane
propamide	

propanthelini bromidum
propantheline bromide
propylidonium
propyliodonium
propylthiouracilum
propylthiouracil
propylphenazonum
propylphenazone
pyridoxini chloridum
pyridoxinium chloride
pyrimethaminum
pyrimethamine
pyroxylinum
pyroxylin
racemethorphanum
racemethorphan
racemorphanum
racemorphan
rutosidum
rutoside
salacetamidum
salacetamide
salazosulfamidum
salazosulfamide
salazosulfathiazolum
salazosulfathiazole
salicylamidum
salicylamide
solutio natrii chloridi composita
compound solution of sodium chloride
solutio natrii lactatis composita
compound solution of sodium lactate
stearylsulfamidum
stearylsulfamide
stibamini glucosidum
stibamine glucoside
streptomycinum
streptomycin
subathizonum
subathizone
sulfacetamidum
sulfacetamide
sulfadimidum
sulfadimidine
sulfisomidinum
sulfisomidine

β -disopropylaminoethyl xanthene 9-carboxylate methylbromide
propyl 3 5-diiodo-4-pyridone acetate
2 mercapto-4-hydroxy 6- α -propylpyrimidine
1 phenyl 2,3-dimethyl-4-isopropyl 5-pyrazolone
4 5-di(hydroxymethyl)-3 hydroxy 2 methyl pyridinium chloride
2 4-diamino-5 *p*-chlorophenyl-6-ethylpyrimidine
soluble guncotton
(\pm) 3 methoxy Δ methylmorphinan
(\pm) 3 hydroxy Δ methylmorphinan
3-rhamnoglucoside of 5 7,3 4 α trihydroxy flavonol
 Δ acetylsalicylamide
p-sulfonamidophenylazosalicylic acid
p-aminophenylsulfonamidothiazole azosalicylic acid
2 hydroxybenzamide
synonym Ringer's solution
synonym Ringer's lactate solution
stearylsulfanilamide
 Δ glucoside of sodium 4-aminophenylstibonate
4-ethylsulfonylbenzaldehyde thiosemicarbazone
p-aminophenylsulfonacetamide
2-sulfanilamido-4 6-dimethylpyrimidine
2,4-dimethyl-6-sulfanilamidopyrimidine

sulfogaiacolum	potassium guaiacolsulfonate
sulfogaiacol	
suraminum natricum	symmetrical urea of the sodium salt of <i>m</i> benzoyl <i>m</i> amino- <i>p</i> -methyl
suramin sodium	benzoyl 1 aminonaphthalene 4 6 8 trisulfonic acid
suxethonii chloridum	bis (2 dimethylaminoethyl) succinate bisethochloride
suxethonium chloride	
thiacetarsamidum natricum	disodium salt of <i>p</i> [bis (carboxymethyl mercapto)arsino] benzamide
thiacetarsamide sodium	
thiazosulfonum	2 4 diaminothiazolylphenylsulfone
thiazosulfone	
thioacetazonum	4-acetamidobenzaldehyde thiosemicarbazone
thioacetazone	
thiodiglycolum	2 2 dihydroxyethyl sulfide
thiodiglycol	
thonzylaminu chloridum	<i>N</i> Δ dimethyl <i>N</i> -(<i>p</i> methoxybenzyl) <i>N</i> (2 pyrimidyl) ethylenedia
thonzylaminum chloride	mine hydrochloride
tocamphylum	diethanolamine salt of tolylmethyl carbinol mono-D-camphoric
tocamphyl	acid ester
tolazolinum	2 benzylimidazoline
tolazoline	
trichloroethylenum	
trichlorethylene	
trihexyphenidyl hydrochloridum	1-cyclohexyl 1 phenyl 3 piperidino 1 propanol hydrochloride
trihexyphenidyl hydrochloride	
trimethadionum	3 5 5 trimethyloxazolidine 2 4 dione
trimethadione	
tripelennamini hydrochloridum	<i>N</i> benzyl <i>N</i> <i>N</i> -dimethyl Δ 2 pyridyl-ethylenediamine hydro-
tripelennamine hydrochloride	chloride
tuaminoheptanum	1 methylhexylamine
tuaminoheptane	
tubocurarii chloridum	D tubocurarine chloride
tubocurarine chloride	
tyrothricinum	
tyrothricin	
urethanum	ethyl carbamate
urethane	
vanyldisulfamidum	4 oxy 5 methoxy 1 benzylidene bis-(aminophenyl)sulfonamide)
vanyldisulfamide	
vinbarbitalum	5-ethyl 5 (1 methyl 1 butenyl) barbituric acid
vinbarbital	

In accordance with paragraph 8 of the Procedure and in the interest of public health the Director General has requested that these names be recognized as the non proprietary names for the substances in question and that the necessary steps be taken to prevent the acquisition of proprietary rights in the names including prohibition of registration of the names as trade marks or trade names*

* Circular letter C.L. 13 1955 P5/438/3 5 April 1955

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sulfogaiacolum	potassium guaiacolsulfonate
sulfogaiacol	
suraminum natricum	symmetrical urea of the sodium salt of <i>m</i> -benzoyl <i>m</i> -amino- <i>p</i> -methyl-
suramin sodium	benzoyl 1 aminonaphthalene 4 6 8 trisulfonic acid
suxethonii chloridum	bis (2 dimethylaminoethyl) succinate bisethochloride
suxethonium chloride	
thiacetarsamidum natricum	disodium salt of <i>p</i> [bis (carboxymethyl mercapto)arsino] benzamide
thiacetarsamide sodium	
thiazosulfonum	2 4 diaminothiazolylphenylsulfone
thiazosulfone	
thioacetazonum	4 acetamidobenzaldehyde thiosemicarbazone
thioacetazone	
thiodiglycolum	2 2 dihydroxyethyl sulfide
thiodiglycol	
thonzylaminii chloridum	<i>N</i> Δ dimethyl <i>N</i> -(<i>p</i> -methoxybenzyl) <i>N</i> (2 pyrimidyl) ethylenedia-
thonzylaminium chloride	mine hydrochloride
tocamphylum	diethanolamine salt of tolylmethyl carbinol mono- <i>D</i> -camphon
tocamphyl	acid ester
tolazolinum	2 benzylimidazoline
tolazoline	
trichloroethylenum	
trichlorethylene	
trihexyphenidyl hydrochloridum	1-cyclohexyl 1 phenyl 3 piperidino-1 propanol hydrochloride
trihexyphenidyl hydrochloride	
trimethadionum	3 5 5 trimethylotazolidine 2 4 dione
trimethadione	
tripelennaminii hydrochloridum	<i>N</i> benzyl <i>N</i> <i>N</i> dimethyl <i>N</i> 2 pyridyl-ethylenediamine hydro-
tripelennamine hydrochloride	chloride
tuaminoheptanum	1 methylheptylamine
tuaminoheptane	
tubocuratinii chloridum	<i>D</i> tubocurarine chloride
tubocurarine chloride	
tyrothricinum	
tyrothricin	
urethanum	ethyl carbamate
urethane	
vanyldisulfamidum	4 oxy 5 methoxy 1 benzylidene bis (aminophenylsulfonamide)
vanyldisulfamide	
vinbarbitalum	5-ethyl 5 (1 methyl 1 butenyl) barbituric acid
vinbarbital	

In accordance with paragraph 8 of the Procedure and in the interest of public health the Director General has requested² that these names be recognized as the non proprietary names for the substances in question and that the necessary steps be taken to prevent the acquisition of proprietary rights in the names including prohibition of registration of the names as trade marks or trade names

² Circular letter C.L. 13 1955 P4/438 3 25 April 1955



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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This study is a comparative survey of the methods of hospitalizing the mentally ill in more than thirty countries. The principal chapters deal with the hospitalization of mental patients, the care of certain special categories (mental defectives, alcoholics, epileptics, etc.), safeguards against arbitrary detention, and trends in current legislation. Six tables furnishing a synopsis of the main admission procedures are appended.

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EIGHTH WORLD HEALTH ASSEMBLY

The Eighth World Health Assembly was held at University City Mexico from 10 to 27 May 1955. It was attended by 76 Member States and Associate Members, representatives of the United Nations and its specialized agencies and observers for 25 intergovernmental and non-governmental organizations concerned with public health.

Or Ignacio Morones Prieto, Minister of Health and Welfare of Mexico, was elected President of the Assembly. In his inaugural address delivered at a solemn ceremony at the Palacio de Bellas Artes, Mexico City, in the presence of H. E. the President of the Republic, Or Morones Prieto emphasized the international significance of WHO's work.

The enthusiastic welcome which the world has accorded the principles set forth in the Constitution of the World Health Organization is evidence of the universality of its aims and of the urgent need that was felt for the creation of an organization which would undertake on so vast a scale the advance of medical knowledge and the improvement of health throughout the world.

Such an effort leads to better understanding among peoples, increases the possibilities of strengthening the bonds of friendship which political differences endanger and above all affirms the principle that public health knows no frontiers—the principle which is at the very foundation of our Organization and which enables it to offer to all countries the aid which the solution of their health problems requires.

Or S. Al Wahbi (Iraq), Or J. Gratzner (Austria) and Sir Arcot Mudaliar (India) were elected Vice Presidents of the Assembly. Professor G. A. Canaperia (Italy) was elected Chairman of the Committee on Programme and Budget and Or P. E. Moore (Canada) of the Committee on Administration, Finance and Legal Matters. Dr H. van Zile Hyde, Chairman of the Executive Board, and Or H. B. Turbott represented the Board.

The Assembly devoted most of its 18-day session to a study of the Organization's activities in 1954 and to consideration of the proposed programme and budget for 1956.

REVIEW OF ACTIVITIES OF 1954

In presenting his report on the work of WHO in 1954, the Director General concentrated particularly on a number of factors which are apt to play a major role in the future development of the Organization. He called attention, for example, to the need for a change in strategy in the Organization's malaria-control programme.

The future efforts to bring safety to the more than 370 million people still exposed to malaria must take into consideration the fact now apparently established, that anopheline mosquitoes which transmit malaria may become resistant to insecticides. The only road open before us is to abandon our old line of action aiming at malaria control and to concentrate on the total eradication of the disease. The great challenge before WHO is, then, to persuade national administrations to organize eradication campaigns and to provide them with all the types of assistance necessary to defeat, during the next decade, a disease which continues to be an actual or potential menace to one quarter of the world's population.

He also emphasized the importance to the Organization of peaceful uses of atomic energy and the possible implications which this new field may have for the work of WHO. He warned, however, that in undertaking new types of activity such as those which developments in the application of atomic energy may bring, WHO must be careful not to upset the "delicate balance" of programmes already in operation.

Dr Candau expressed the hope that the Organization's extremely limited financial resources might be augmented to make

SCHEDULE OF MEETINGS

4-23 July	Meat Hygiene Seminar Alexandria
4-28 July	Nursing Education Seminar, Suva, Fiji
11-30 July	CCTA/WHO Training Course on Rabies Nairobi
25-30 July	Expert Committee on Environmental Sanitation fourth session, Geneva
26-29 July	European Regional Advisory Group on Water Standards Geneva
8-20 August	United Nations Conference on the Peaceful Uses of Atomic Energy Geneva
14-27 August	Seminar on Sewage Disposal Kandy Ceylon

The mention of manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature which are not mentioned. Proprietary names of such products are distinguished by initial capital letters.

was stressed and considerable achievement was noted. The delegate of Syria called attention to health education as a necessary concomitant of improvements in environmental sanitation stating that perhaps more than half of the world's inhabitants still had no real understanding of contamination and no conception of the fact that contagion existed. The public health service that was preoccupied with the engineering and regulatory aspects of sanitation he said was largely protecting people from themselves whereas it could be helping people to help themselves through proper emphasis on teaching principles of hygiene.

Another basic problem—nutrition—was discussed by delegates from several countries.

The delegate of Indonesia said that malnutrition affected 40% of the children of pre school age in Djakarta. The solution he believed lay in providing animal protein particularly milk and an attempt was being made to accomplish this by importing Holstein cows from the Netherlands and cross breeding them with Indonesian cows to produce a stronger milk yielding breed. In rural areas people were being encouraged to use milk from goats, sheep and even the buffalo. Efforts were also being made to educate mothers in the proper feeding of infants and children.

The delegate of India called attention to the role of bad dietary habits in malnutrition and to the consequent need for health education in this regard.

The delegate of Nicaragua paid tribute to WHO and UNICEF for aid in a combined maternal and child health and nutrition programme in his country. In 1954 UNICEF had provided the Government with a milk drying plant so that the country was now able to provide all the milk necessary for this programme.

The delegate of Mexico stated that dietary surveys had been carried out in his country and that it had been found that malnutrition

existed in most areas with both economic and cultural causes being responsible. He said that animal protein was not available to 80% of the population because of its cost and that means should be found to add protein rich foods such as dried fish, peas, beans and powdered milk to the diet. Health education was another means by which his Government was striving to improve nutrition.

The delegate of France emphasized the importance of health education and of developing the production of local foods as means of solving the problem of malnutrition. He suggested that WHO could usefully advise governments on the nutritional value of certain foodstuffs and on the determination of the population groups whose diet should be supplemented and could train staff to evaluate the effects of certain foods on the physical and moral well being of the people concerned.

A number of delegates expressed regret that the Organization's mental health programme was not more extensive. The delegate of Ireland for example said that the increasing strain of modern life made mental upsets commoner and psychiatry ever more necessary and that psychosomatic illness caused such a loss of working days that any time and money spent on the improvement of mental health would be economically justifiable. He remarked that within the past three years everyone had become "converted" to environmental sanitation, probably as a result of the Assembly technical discussions and increased effort on the part of the Organization and he stated that what was needed now was a similar conversion to an appreciation of the need for extended public health services in mental health.

PROGRAMME AND BUDGET FOR 1956

The Assembly approved the proposed programme and budget for 1956.² A budget

Continued in O.S. Rec. Wld. Hlth. Org. 1954: 58

possible assuming more tasks as well as continuing its present work

In discussing the Director General's report¹ delegates from various countries commented on the accomplishments of WHO made suggestions for future programmes and gave brief sketches of health activities within their own borders

Satisfaction was expressed with regard to the increasing stress which the Organization is placing on long term programmes which may be integrated into the public health services of the countries assisted. It was pointed out by the delegate of Italy for example, that, although this type of work might be less spectacular than that which characterized the Organization's early days it was the only means of making a truly constructive and lasting contribution to the solution of the health problems of the world. And the delegate from Morocco (French Zone) expressed the opinion that this was in fact the way to assure the continuity of the Organization's work. The role of WHO he stated, was not so much that of a supplier of personnel and equipment for countries handicapped by disease poverty or ignorance as that of a catalyst of all the agents used in combating poverty and illness.

In discussing the Organization's activities relative to communicable diseases the delegates were especially concerned with malaria. They expressed general agreement with the policy of concentrating on malaria eradication as a means of meeting the situation caused by the development of anopheline resistance to insecticides. With regard to tuberculosis it was suggested that the Organization should pay particular heed to the new drugs which were being used in therapy and to studying the possibilities of domiciliary care for tuberculosis patients especially in the less developed countries where hospitalization was usually out of the question.

¹ A complete account of these discussions will appear in *Off Rec. Wld. Hlth. Org.* 1955 63

The delegate of Morocco (French Zone) reported on the pilot project against trachoma which his Government had been carrying out with WHO and UNICEF collaboration. This project in operation for four years was based on the administration of antibiotics at regular intervals to control the conjunctivitis associated with trachoma. With a view to developing an integrated national programme a system of self treatment had been instituted during the third year of the campaign. Medicaments in the form of ointments had been distributed free of charge and, after training in the purpose and the simple method of application of the salves, mothers were able to treat themselves and their families. Encouraging results had been achieved even among the less advanced population groups and the people were beginning spontaneously to purchase aureomycin ointment which had been placed on sale in tobacco shops in the southern part of the country. Despite a minor recrudescence of the disease towards the end of the summer season the results achieved during the four year campaign indicated that the methods used could be successfully applied in many parts of the world.

The Regional Director for the Eastern Mediterranean and the delegate of Iran mentioned that the BCG team in Iran had been instructed to carry out simultaneously BCG and smallpox vaccinations and that if this practice was successful it would be extended to other countries. The Assembly again urged health administrations to conduct wherever necessary campaigns against smallpox as an integral part of their public health programmes.

It was proposed by several delegates that the Organization should begin to take a more active interest in cancer cardiovascular diseases and other degenerative diseases which took such a great toll in certain countries.

The importance of environmental sanitation as a fundamental in health improvement

was stressed and considerable achievement was noted. The delegate of Syria called attention to health education as a necessary concomitant of improvements in environmental sanitation stating that perhaps more than half of the world's inhabitants still had no real understanding of contamination and no conception of the fact that contagion existed. The public health service that was preoccupied with the engineering and regulatory aspects of sanitation he said was largely protecting people from themselves whereas it could be helping people to help themselves through proper emphasis on teaching principles of hygiene.

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The delegate of Nicaragua paid tribute to WHO and UNICEF for aid in a combined maternal and child health and nutrition programme in his country. In 1954 UNICEF had provided the Government with a milk drying plant so that the country was now able to provide all the milk necessary for this programme.

The delegate of Mexico stated that dietary surveys had been carried out in his country and that it had been found that malnutrition

existed in most areas with both economic and cultural causes being responsible. He said that animal protein was not available to 80% of the population because of its cost and that means should be found to add protein rich foods such as dried fish, peas, beans and powdered milk to the diet. Health education was another means by which his Government was striving to improve nutrition.

The delegate of France emphasized the importance of health education and of developing the production of local foods as means of solving the problem of malnutrition. He suggested that WHO could usefully advise governments on the nutritional value of certain foodstuffs and on the determination of the population groups whose diet should be supplemented and could train staff to evaluate the effects of certain foods on the physical and moral well being of the people concerned.

A number of delegates expressed regret that the Organization's mental health programme was not more extensive. The delegate of Ireland for example said that the increasing strain of modern life made mental upsets commoner and psychiatry ever more necessary and that psychosomatic illness caused such a loss of working days that any time and money spent on the improvement of mental health would be economically justifiable. He remarked that within the past three years everyone had become "converted" to environmental sanitation probably as a result of the Assembly technical discussions and increased effort on the part of the Organization and he stated that what was needed now was a similar conversion to an appreciation of the need for extended public health services in mental health.

PROGRAMME AND BUDGET FOR 1956

The Assembly approved the proposed programme and budget for 1956. A budget

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of US \$10 203 084 will finance more than three hundred major health programmes. This amount includes \$309 484 for the provision of supplies and equipment to the health services of countries participating in malaria eradication campaigns and \$42 000 to launch the Organization's activities relative to the uses of atomic energy in medicine and public health and to the protection of populations against the effects of atomic radiation.

These two subjects—malaria eradication and WHO's responsibilities relative to developments in the application of atomic energy—were discussed at some length by the Committee on Programme and Budget.

There were delegates who felt that the objective of eradication of malaria was somewhat utopian, especially with regard to the infected areas in Africa. Doubts were also expressed as to the Organization's financial ability to contribute substantially to the attainment of such a goal. However, Dr Paul Russell, WHO Malaria Consultant, explained that the Organization did not propose to embark upon extensive malaria eradication programmes but simply to increase its aid in the form of technical guidance and encouragement to governments which would be largely responsible for carrying out the necessary campaigns. Dr Russell admitted that Africa presented special problems, but problems which could be solved: he foresaw that eradication of malaria might require more time in Africa than in other infected regions, but he pointed out Africa would undoubtedly benefit from the programmes carried out in other parts of the world. The Director General stated that it would, of course, be impossible for WHO to undertake the eradication of malaria: the Organization had an important function, however—that of stimulating action on the part of governments and of co-ordinating the available resources.

The Assembly delegates were wholeheartedly in accord with the steps taken by the

Director General to prepare WHO's participation in the forthcoming United Nations conference on the peaceful uses of atomic energy and approved of the caution with which the Organization was moving in formulating a programme on atomic energy in medicine and public health.

Emphasis in the discussion was on the need for study of the problems connected with protection against the effects of atomic radiation. The delegate of Norway, for example, called attention to the problem of the "fall out" the radio active material produced by atomic explosion experiments and to the question of contamination of drinking water, food plants, etc. He also mentioned a problem of particular concern to his country, a seafaring nation. Norway would be building merchant ships propelled by atomic energy and a health problem which should be considered would be the possible dangers of such a ship's sinking in shallow water.

The delegate of Yugoslavia reported that there were three research institutes in his country which were working on the peaceful uses of atomic energy and that these institutes would be glad to co-operate with the Organization. The delegate of France also indicated that his Government was working on the applications of atomic energy in industry and in medicine and pledged its support to the relevant activities of WHO.

The delegate of Syria expressed the hope that small atomic reactors might be built by means of funds pooled by countries unable to afford them individually so that the gap in the level of medical practice between highly developed areas and the less developed areas might not be widened by progress realized in the medical applications of radio-isotopes.

Several delegates suggested that WHO should establish regional centres for training technical personnel in work with atomic energy, but it was decided that the Organization should not yet assume such a respon-

sibility It was generally agreed that WHO's activity for the moment should be confined largely to collecting and disseminating information and that the Organization's role would become clearer after the United Nations conference

WHO's relations with UNICEF were reviewed by the Committee on Programme and Budget Satisfaction was expressed with regard to the excellent co-operation between the two organizations and certain difficulties relating to division of financial responsibilities were discussed The Assembly subsequently took steps to enable WHO to assume the responsibility for personnel costs in jointly assisted UNICEF/WHO projects \$240 000 were added to the budget proposals for 1956 to provide half the costs of the international personnel in joint projects in 1956 and the Director General was requested to include in his annually proposed programme and budget estimates beginning in 1957 full provision for these costs

Another subject considered by the Committee on Programme and Budget was the Organization's programme relative to poliomyelitis Following a suggestion of the Director General the Committee decided that certain savings effected as a result of Executive Board action in January 1955 should be devoted to poliomyelitis activities in a manner to be determined by the Director General

GENERAL PROGRAMME OF WORK COVERING A SPECIFIC PERIOD

The Assembly also approved a general programme of work for the years 1957-60 inclusive² Dr H van Zile Hyde representing the Executive Board outlined the main points of this programme which included the principles of the first general programme³ but

in a form somewhat modified by experience and stated in broader terms

A fundamental principle was that all countries should participate in the work of the Organization and should be eligible to receive assistance and that there should be full reciprocal co-operation on the part of all countries The functions of WHO should be confined to those that were best carried out by international action The Organization would continue to promote and co-ordinate research but would not actually engage in research Assistance to governments would be conducted along the same lines as in the past and would be given only in response to a specific request The aim was to foster self reliance to plan the assistance so that it could be integrated with other technical social and economic developments in the country and to make sure that it would be within the capacity of the country concerned and of WHO to complete the action once it had been started The importance of inter-country programmes was emphasized WHO should encourage the general trends towards integrated health programmes

The professional and technical education of national health personnel should be adapted to local needs and in countries where it was not yet possible to provide full professional services for the whole population the Organization should help in the training of auxiliary workers

In summary the new programme created a broader framework for WHO's activities and laid greater emphasis on the Organization's functions of co-ordination and leadership More attention was paid to planning and evaluation and to the integration of health services into the general economic and social development of the community

ASSEMBLY DECISIONS

In all, the Eighth World Health Assembly adopted 47 resolutions The following were among the more significant decisions taken

New Member

The Sudan was admitted as an Associate Member of the World Health Organization, bringing the total membership to 85

Malaria eradication

A world fund to assist national programmes for the eradication of malaria was established. This fund, to be administered by WHO, will consist of voluntary contributions from governmental and private sources. It will be used for research and for the provision of supplies, equipment, and services to governments requiring such aid.

Atomic energy

The Assembly approved the action and the proposals of the Director General relative to the Organization's responsibilities with regard to atomic energy in relation to medicine and public health. WHO's chief functions will be to collect and disseminate information to give aid in the training of technical personnel and to provide expert advice. For the moment the Organization will be primarily concerned with (a) the protection of populations against radiation, this including problems involved in the location of atomic energy plants, contamination of water, soil, food, etc., and the disposal of atomic waste material, and (b) the international aspects of training personnel for work in the medical and public health applications of atomic energy.

Poliomyelitis

The basic network of poliomyelitis laboratories which has been set up by WHO is to be enlarged. The laboratory centres in addition to studying the various strains of polio virus will prepare and distribute standard laboratory reagents to facilitate the work of national poliomyelitis centres and will train virus specialists in tissue culture techniques.

International Sanitary Regulations

The provisions concerning yellow fever were given particular consideration in this Assembly's review of the operation of the International Sanitary Regulations, and additional regulations were adopted. The Regulations were amended so that the quarantine restrictions regarding yellow fever should apply only to infected local areas instead of to yellow fever endemic zones. Infected local area, in reference to yellow fever, means (a) a local area where there is a non-imported case of the disease or (b) a local area where activity of yellow fever virus is found in vertebrates other than man.

Scale of assessments

A new scale of assessments of Members States contributing to WHO's regular budget was adopted. This scale, based on the latest United Nations scale, will be applied progressively over a period of four years starting in 1956. The largest contributor, the United States of America, will within the same period have its share of the budget reduced to 33 1/3% of the total assessments of Members actively participating in the work of the Organization.

Elections to the Executive Board

Six countries were elected to designate members to serve on the Executive Board: Argentina, Ecuador, Finland, Pakistan, the Philippines, and Portugal. The designated members will succeed the six whose terms expire this year: Professor M. J. Ferreira (Brazil), Dr P. E. Moore (Canada), Professor O. Andersen (Denmark), Professor J. S. Saleh (Iran), Dr H. B. Turbott (New Zealand), and Dr M. Mackenzie (United Kingdom).

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The Eighth World Health Assembly closed with expressions of gratitude to the Government of Mexico host of the Assembly and with tributes to WHO and its work. Among the latter was the opinion voiced by the delegate of Lebanon

[WHO] is the only worldwide organization in which one but rarely breathes the heavy air of politics. This is shown by freedom of action and

of speech, and the atmosphere of fraternity and perfect democracy that prevails in the Organization. The delegates of even the smallest and weakest nation do not hesitate to discuss question, and reject the ideas of the greatest and most powerful country in a spirit of mutual respect and fairness. Nor are there any differences because of race colour or creed. All are united by the spirit of collaboration. This Organization, from every point of view serves as an instrument for world peace and mutual understanding.

SIXTH AWARD OF THE LEON BERNARD FOUNDATION PRIZE

Dr Andrija Stampar President of the Academy of Sciences and Arts of Yugoslavia was the sixth recipient of the Leon Bernard



Profile of Andrija Stampar

Foundation Prize and Medal which were awarded to him at the Eighth World Health Assembly. This award perpetuating the

memory of Professeur Leon Bernard member of the League of Nations Health Committee and an outstanding worker for world health is made in recognition of contributions to and practical achievements in social medicine. Previous winners of the prize and medal are Dr W. A. Sawyer (USA), Dr Rene Sand (Belgium), Dr C. E. A. Winslow (USA), Dr Johannes Frandsen (Denmark) and Professeur Jacques Parisot (France).

In presenting the prize the President of the Eighth World Health Assembly reviewed Dr Stampar's public health career stressing his encouragement of the cause of social medicine in Yugoslavia and in other countries.

Andrija Stampar was born at Drenovac, a village near Brod on the Sava River (Croatia) on 1 September 1888. He obtained his medical degree at the University of Vienna in December 1911. In his student days in Vienna he became keenly interested in problems of social medicine, particularly those relating to alcoholism, a subject on which he delivered a series of lectures and published a number of articles.

From 1912 to 1913 he worked as hospital physician at Karlovac and from 1913 to 1918 as district physician at Nova Gradiska. In this work he became acquainted with the health problems of rural populations. It was the time of the First World War and health conditions in Croatia were far from satisfactory. They called for energetic action, and Dr Stampar performed outstanding work, particularly in organizing campaigns against epidemic diseases.

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September and October 1946. In July 1948 he was elected President of the First World Health Assembly in Geneva. As Yugoslav delegate he continued to take an active part in the meetings of the World Health Organization and put forward numerous constructive proposals such as the technical discussions on "Public Health Problems in Rural Areas" held in Geneva during the Seventh World Health Assembly in 1954. He also attended the First World Conference on Medical Education in London in 1953.

Dr Stampar is an honorary member of the Public Health Association of the United States of America, an honorary member of the Academy of Medicine in New York, and a corresponding member of the Serbian Academy of Sciences at Belgrade and the Slovenian Academy of Sciences at Ljubljana. He is the author of several books on social and medical problems.

Dr Stampar, in accepting the award, paid tribute to those who had influenced him in his studies and his work and related some of his personal experiences in social medicine and public health.

It is a great honour and recognition of my work to be awarded the Léon Bernard prize. I first met Léon Bernard at those sessions of the Health Organisation in Geneva at which it was decided that besides the statutory obligations, the main aim of the Organisation should be to study important health problems of the time. Léon Bernard was then generally regarded as one of the most prominent supporters of progressive ideas in medicine, advocating the concept of a medicine which should serve the people and be entirely at its disposal, a medicine based on social principles. My recollection of the Léon Bernard of those days has remained vivid in my mind up to the present time.

On this occasion, however, my memory also goes to those who preceded me in being awarded the prize founded in remembrance of Léon Bernard. First there is the late Dr Sawyer, whose contribution to the widening and strengthening of national health services all over the world is especially significant, as are also in no small measure his achievements in the control of communicable diseases. There is also René Sand, who passed away two years ago but whom we shall always remember as an indefatigable social worker and author of a series of remarkable works in which he has brought to light the close connexion between socio-economic factors and health, and who enriched us with historical studies in the development of socio-medical views and social

medicine from ancient times. I should also like to evoke the memory of Professor Winslow, my old friend from the time of the League of Nations, who deeply impressed me by his progressive thought and his fight for the acceptance of social aspects in medicine, which he courageously propagated at various meetings and committees. Dr Frandsen, the organizer of health service in Denmark, has emphasized the special role of the practitioner in the promotion of public health. Last year we were listening to Professor Parisot, who not only called up our memories of Léon Bernard, but stood in front of us as a living example of a steady worker and promoter of advanced socio-medical concepts. He has successfully linked together public health services and education in medical schools.

Looking retrospectively at my work in the field of social medicine, I should like to tell you a little about the circumstances in which I was brought up, in which I learned and worked, and about some people who influenced me, rather than speak about my work itself. As a medical student I lived in a small village of some hundreds of inhabitants, who toiled at their land to earn their living. This people was my first and best teacher. I learnt from them to look upon life realistically, and they first made me think of innumerable factors connected with so many fields of human activities which influence health. In the atmosphere of this laborious people my views were formed, and my future as a worker on promotion of public health was decided. At that time there was no medical school in my country and I had to go abroad to obtain medical training. I obtained it in Vienna, at one of the best medical schools in the world at that time. In those years, owing to the activity of social workers and politicians, it was already getting more and more evident that medicine ought to be entirely at the service of the people. Of course, the voice of these pioneers was still feeble, but time has shown that the seed they sowed has given good results. The working class, fighting very hard for elementary living conditions, had a thirst for knowledge, and the people's universities in which workers took an active part, made clear to everyone who wanted to see that the health of a nation was not only the task of a physician, but of the nation as a whole. This was the time when Professor Tandler delivered speeches at public meetings about health as a condition for the existence of a progressive society and a right belonging to everybody. Later on he organized the health service of the town of Vienna, whose efficient functioning set an example of how a health service should be organized and how much could be done for the promotion of public health by using public means.

At the end of my university days, there were a

At the end of the war in 1918 Dr Stampar was appointed medical adviser to the provisional Government at Zagreb. In 1919 when he was only 31 years old he was appointed Director of Public Health in the Ministry of Health in Belgrade in the newly created Yugoslavia. In this position he rendered outstanding service to his country by laying the foundations of a public health service in Yugoslavia which reflected his advanced ideas on the preventive and social aspects of the protection of the health of the community. He created and organized a network of health services with health centres as the basic field units. With the support of the Rockefeller Foundation he was able to establish the School of Public Health at Zagreb which in the course of time has become a post graduate medical training centre for the whole country and in which particular emphasis is laid on specialized training in social medicine and hygiene.

In May 1931 on leaving the Ministry of Health he was elected Professor of Hygiene and Social Medicine in the Faculty of Medicine of the University of Zagreb his appointment eventually being confirmed by the Government.

He had already begun his dynamic and distinguished career in the field of international health service as early as 1924 first as a member of various commissions and committees of the Health Organisation of the League of Nations and later as a member of the Health Committee of the League. In 1931 he took active part in the European Conference on Rural Hygiene. From 1931 to 1933 he lectured on hygiene and social medicine as visiting professor at universities and health institutes in several European countries. He visited the United States under the sponsorship of the Rockefeller Foundation. From 1933 to 1936 he was assigned by the League of Nations to work on the organization of public health services in China and made a valuable contribution to the development of public health administration in that country. In 1936 he attended a meeting of the Health Committee of the League of Nations in Moscow and visited health institutions in the USSR particularly the health services of the collective farms. From the end of 1936 to the end of 1937 he worked at the League of Nations headquarters in Geneva where he devoted himself mainly to the problems of organization of schools of public health in the European countries and of maternal and child health services. At the end of 1937 he delivered the Cutter lecture at Harvard University and gave a series of lectures on hygiene and social medicine in the medical schools of a number of universities in the United States of America. In 1938 he was appointed Rosenberg Professor at the University of California and remained there until the outbreak of the Second

World War when he returned to Yugoslavia and resumed his post as Professor of Hygiene and Social Medicine at the University of Zagreb being elected Dean of the Medical Faculty the following year. He focussed his efforts on reform in medical education and on the protection of students' health. His work was interrupted from April 1941 to May 1945 on account of the Second World War.

At the end of the war Dr Stampar was re-appointed Professor of Hygiene and Social Medicine as well as Director of the School of Public Health at the University of Zagreb. He was Rector of the University from 1945 to 1946 and in 1952 was elected Dean of the Medical Faculty at Zagreb. In this capacity in a relatively short time he introduced significant reforms in medical education. He devoted particular attention to nursing education. A Division of Nursing was established at the Medical Faculty and the former School of Nursing at Zagreb was given the rank of an institution of secondary education.

In February 1947 Dr Stampar became a member of the Yugoslav Academy of Sciences and Arts at Zagreb the most important scientific institution in the country and in March of the same year he was elected its President. Under his leadership the Yugoslav Academy has expanded its activity in all fields of the arts and sciences. He founded the Institute of Industrial Hygiene at Zagreb which is the first institution of its kind in Yugoslavia. It should also be noted that Dr Stampar has always endeavoured to enable young doctors to obtain specialized training abroad.

Dr Stampar's post war activity in the field of international co-operation and the promotion of public health is of no less importance. In 1945 he attended the meetings of the Ministers of Foreign Affairs as a member of the Yugoslav Delegation and in 1946 the Conference of the United Nations in London where he was elected the first Vice President of the Economic and Social Council of the United Nations and was appointed a member of the Technical Preparatory Committee for the creation of the World Health Organization. He took active part in the meetings of that Committee in Paris in March and April 1946 in the meetings of the Economic and Social Council in New York in May and June of the same year and in the International Health Conference in New York in June 1946. He was then elected Chairman of the Interim Commission which was authorized by the New York Conference to assume the responsibilities of the future World Health Organization pending the entry into effect of its Constitution. He presided over a number of important meetings at the third session of the Economic and Social Council of the United Nations in

PUBLIC HEALTH PROBLEMS IN RURAL AREAS

Technical Discussions at Eighth World Health Assembly

For the second successive year the topic of the technical discussions held in conjunction with, but not subject to official action by the World Health Assembly was "Public Health Problems in Rural Areas". This year's discussions were marked by a programme of field visits arranged by the Government of Mexico which enabled the participants to observe the rural health services of the country. These visits together with background information furnished by the Mexican Government served as the basis of the discussions.

The Chairman of the discussions was Dr M. Martinez Baez, Director of Mexico's National Institute of Tropical Diseases.

The discussions emphasized the fact that the health problems of rural populations are among the major concerns of WHO Member Governments since they represent the health problems of about two-thirds of mankind. Some idea of the nature and magnitude of these problems can be gathered from the following:

—1300 million people live in rural areas and are occupied in agriculture.

—The life expectancy of these people is low in underdeveloped countries as low as 32 years in comparison with 60 years in certain urban areas of other countries.

—Although they are the main food producers, people in rural areas are often the worst fed both quantitatively and qualitatively.

—They suffer from a shortage of clothing, and their housing conditions are generally bad—overcrowded and lacking in elementary sanitation.

—In most of the underdeveloped agricultural countries illiteracy ranges from 60% to almost 100% of the population.

—Many diseases—malaria, yaws, bilharziasis, hookworm, gastro-intestinal disorders and nutritional diseases—are predominantly rural and often hinder the social and economic development of the country.

—There is a shortage of medical aid in rural areas everywhere.

—Agricultural people are particularly exposed to animal diseases transmissible to man, such as bovine tuberculosis, brucellosis, rabies and others.

In this year's discussions stress was laid on the importance of combining efforts to improve health with others designed to raise the general standard of living of rural populations. This keynote was sounded by Dr Martinez Baez in his opening statement.

Any real amelioration of the standard of health in the rural environment must depend, in the first place, upon the improvement of living conditions generally. Rural health cannot be improved by public health alone. What is needed is, above all, a clear understanding of the nature of the obstacles that give rise to a certain manner of living, thinking, and feeling—that is to a particular culture. Health is not always the main preoccupation of those who spend their lives in poverty and want. Their primary concern is with personal safety, food, work, rain or drought, the wrath of the gods; they ignore health or fail to accord it the importance it deserves. In other words, health is only a part of all that goes to make up human well-being, and any effort to achieve a real improvement in health must take account of the other elements of that well-being.

few other professors who promoted the ideas of social medicine and tried to make clear not only to medical students but also to the public in general that social medicine was the medicine of the future. We were listening—among some hundreds of students I must admit only three of us—to Dr Teleky who stands so vividly in my mind as a pioneer teacher of social medicine at a time when it was hardly beginning to make its first steps forward. In my own country I was glad to have also a great teacher Professor Jovanovic Batut unfortunately not known enough abroad who worked in Serbia and afterwards in Yugoslavia. In a brilliant style and with a deep knowledge of the life of our people he brought home the fact that a thorough knowledge of the health conditions of the people as a whole and the collaboration of medical workers with the people are indispensable to the promotion of public health and that—having this purpose in view—merely treating the sick is far from being sufficient. Dedicating all his life to his work Professor Jovanovic has been for me the brightest example of a teacher whose leading idea was that physicians should devote more time both to studying and to teaching the people than anybody else. This idea has been in fact the principle taken up by social medicine as the starting point of its activity and the foundation of its later success.

In the early twenties of this century the idea of international collaboration in the field of public health—sponsored by intergovernmental agencies and other organizations among which the Rockefeller Foundation played a well known role—grew up more and more intensely. The examples of this collaboration have become my new teachers. At various meetings in discussions and demonstrations in exchanges of physicians and other medical staff year by year I enlarged my knowledge and obtained experience in dealing with socio-medical problems. At the same time by means of this collaboration social medicine gained ground and was given its proper place among other sciences. This collaboration covered various fields of work such as nutrition, treatment of social diseases, medical education etc. and greatly contributed to the solution of

extremely complex socio-medical problems. Through this collaboration this great teacher in my life I got acquainted with many foreign countries with other continents and became conscious of how much economic and cultural conditions influence human health and of how true was the fundamental idea of social medicine that dealing with health problems was by no means the domain of the physician only but the task of a working team consisting of engineers, chemists, educators, agriculturists, veterinary scientists, nurses and other technical staff and that the effort made in the field of social medicine could be successful only on the basis of such collective work. Another thing I learned while getting into touch with foreign countries is that the experience obtained in one country cannot be transferred and applied to another without thinking out afresh seriously and thoroughly every problem and every question in terms of history, socio-economic structure, customs, psychology and all other environmental factors decisive in the formation of human beings. But I also learned that a genuine and really close collaboration among all nations is essential in matters of health.

When remembering the past and thinking of the present day which is of such importance to me I know that I could have done nothing for the promotion of socio-medical activities without those who have supported me in this task without my teachers without the help given to me by my country—particularly in the last years after its liberation—in carrying out the programme of reconstruction in economic and social fields and adopting the principle of health for all without international collaboration and without the people among whom I live and whose health has been the concern of all my life. My gratitude also goes to all my collaborators because little could have been achieved without their help.

Allow me to thank you once more for the honour you are doing me. My only wish is to be worthy of it and I promise you that the few years of active life that I have before me will be dedicated, as those of the past to our common aim to world health.

Public Information Booklet

The story of WHO and its work is described and illustrated by photographs in a new WHO public information booklet *A strategy for world health*. This booklet is available in English, French and Spanish. It replaces a similar publication *The lamp is lit* of which supplies are now exhausted.

PUBLIC HEALTH PROBLEMS IN RURAL AREAS

Technical Discussions at Eighth World Health Assembly

For the second successive year the topic of the technical discussions held in conjunction with but not subject to official action by the World Health Assembly was "Public Health Problems in Rural Areas". This year's discussions were marked by a programme of field visits arranged by the Government of Mexico which enabled the participants to observe the rural health services of the country. These visits together with background information furnished by the Mexican Government, served as the basis of the discussions.

The Chairman of the discussions was Dr M. Martinez Baez, Director of Mexico's National Institute of Tropical Diseases.

The discussions emphasized the fact that the health problems of rural populations are among the major concerns of WHO Member Governments since they represent the health problems of about two thirds of mankind. Some idea of the nature and magnitude of these problems can be gathered from the following:

—1300 million people live in rural areas and are occupied in agriculture.

—The life expectancy of these people is low in underdeveloped countries as low as 32 years in comparison with 60 years in certain urban areas of other countries.

—Although they are the main food producers people in rural areas are often the worst fed both quantitatively and qualitatively.

—They suffer from a shortage of clothing and their housing conditions are generally bad—overcrowded and lacking in elementary sanitation.

—In most of the underdeveloped agricultural countries illiteracy ranges from 60% to almost 100% of the population.

—Many diseases—malaria, yaws, bilharzias, hookworm, gastro-intestinal disorders and nutritional diseases—are predominantly rural and often hinder the social and economic development of the country.

—There is a shortage of medical aid in rural areas everywhere.

—Agricultural people are particularly exposed to animal diseases transmissible to man such as bovine tuberculosis, brucellosis, rabies and others.

In this year's discussions stress was laid on the importance of combining efforts to improve health with others designed to raise the general standard of living of rural populations. This keynote was sounded by Dr Martinez Baez in his opening statement.

Any real amelioration of the standard of health in the rural environment must depend, in the first place, upon the improvement of living conditions generally. Rural health cannot be improved by public health alone. What is needed is, above all, a clear understanding of the nature of the obstacles that give rise to a certain manner of living, thinking and feeling—that is to a particular culture. Health is not always the main preoccupation of those who spend their lives in poverty and want. Their primary concern is with personal safety, food, work, rain, or drought. The wrath of the gods they ignore, health or fail to accord it the importance it deserves. In other words, health is only a part of all that goes to make up human well-being, and any effort to achieve a real improvement in health must take account of the other elements of that well-being.

The main points brought out by the general discussions were (1) that any rural health programme should be based on adequate knowledge of the area concerned, including geography and climate, culture, the health status of the population, economic level and structure educational levels and governmental organization (2) that a multi purpose approach for community development and improvement is best, with health activities being combined with others relative

to agriculture education etc (3) that community participation in the programme is essential though there should be some central support in the form of leadership guidance, and technical assistance, and (4) that rural health programmes may often be initiated by specific health activities (e.g. a campaign against yaws or malaria) which may later be integrated into a general programme and be incorporated into rural health services

DR IGNACIO MORONES PRIETO

President of the Eighth World Health Assembly



*Dr Ignacio Morones Prieto
President of the Eighth World Health Assembly
receives the congratulations of Dr J N Togba
President of the Seventh World Health Assembly*

Dr Ignacio Morones Prieto was born in 1900 at Linares Nuevo Leon Mexico. He studied medicine and surgery at San Luis Potosi University and later at the Paris Faculty of Medicine where he took his surgeon's degree.

On returning to his country he founded the San Luis Potosi Medical and Surgical Clinic and was appointed Director of the San Luis Potosi General Hospital and subsequently Rector of the University of that city. During the period when Dr Miguel Alemán was President of the Republic of Mexico Dr Morones Prieto served as Under Secretary for Health and Social Welfare and as Governor of the State of Nuevo Leon.

On 1 December 1952 shortly after the investiture of President Adolfo Ruiz Cortines Dr Morones Prieto was appointed Minister of Health and Welfare which post he still holds.

Dr Morones Prieto is a member of the National Academy of Medicine and of the Mexican Academy of Surgery.

Reports of Experts Groups

NUTRITION

In attempting to solve nutrition problems consideration must be given not only to the necessity of obtaining practical results within a short period of time but also to the maintenance of a balance between immediate measures which can give temporary improvement in nutrition and long range measures intended to secure lasting effects. The Joint FAO/WHO Expert Committee on Nutrition expresses this opinion in its fourth report¹ and tries to satisfy both requirements in reviewing and evaluating the relevant programmes of FAO and WHO and in discussing a number of specific nutrition problems.

Calorie requirements

In 1950 FAO published a report on calorie requirements² which has since been used in several countries for investigations of various kinds—for example in the assessment of the requirements of restricted populations in some countries including Italy, Japan, Korea and Taiwan in the establishment of recommended dietary allowances in the USA and in special studies in Central America, the Netherlands, Panama, the United Kingdom and Venezuela. On the basis of the experience gained in the use of this report its revision by a committee appointed for this purpose is recommended.

Certain points are suggested for consideration in this proposed revision:

(1) the use of anthropometric data in the computation of energy expenditure and needs

(2) the decrement for age in adult calorie levels (the present report recommends a decrease of 75% in calorie requirements per decade of age beyond 25 and this has been found too high in several countries)

(3) the difference in the energy needs of boys and girls at different ages

(4) the definition of activity levels for the "reference" man and woman

(5) the special allowances for women during pregnancy and lactation

(6) the use of actual human environmental temperatures

(7) the value of various body measurements including that of subcutaneous fat in the assessment of nutritional state with regard to calories

(8) the proportion between protein, fat and carbohydrate in the diet in relation to their physiological destination and to their contribution to energy expenditure

(9) the need for expressing in food supply and consumption data the amounts of energy provided by proteins, fats and carbohydrates respectively

(10) the relation between actual calorie intake and available calories calculated from supply data obtained at various stages from production to consumption

(11) the contribution of alcohol to calorie requirements for various purposes

Diet and health

As in previous reports of this committee particular attention is paid to protein malnutrition and its solution through the provision of greater supplies of protein rich foods for mothers, infants and children. There is need to develop foods which utilize good sources of protein other than milk for the mixed feeding of infants and for improving the diets of children. Careful study of the nutritive value of such foods, of their suitability for children and of methods of

¹ *W.H.A. Org. techn. R. p. Ser. 1955* 87, 58 pages. Price 3s. 6d. or 5s. 12.—Published in English, French, and Spanish.

² Food and Agricultural Organization of the United Nations, Committee on Calorie Requirements (1949) *Calorie Requirements of Man*. Report of the Committee on Nutrition, 12-16 September 1949 (FAO Technical Studies, No. 5).

storage preservation, and distribution is also required

Another subject treated at some length is the enrichment of dried skimmed milk with vitamins A and D. Milk in this form is coming into increasing use and has been found valuable as a source of easily assimilated animal protein in supplementary and emergency feeding programmes. However, the skimming process removes vitamin A. Provided technical difficulties can be solved the addition of vitamins A and D to dried milk for use in nutrition programmes in areas in which deficiency of these vitamins is prevalent could do much to increase the value of this surplus food.

Pellagra, a nutritional disease associated with a diet restricted in variety in which maize predominates is described and discussed. It is suggested that a summary of the information available on pellagra should be prepared and published in order to call attention to the disease as a public health problem, stimulate further research and aid in planning control programmes. Countries in which pellagra is a problem because of the high consumption of maize must be encouraged to develop agricultural production of other appropriate foods to improve diet through educational programmes and to undertake pilot projects for the control of the disease.

A section of the report is devoted to diseases caused by excessive consumption of certain foods. There is evidence to suggest that degenerative heart disease which is the most frequent cause of death in North America in most of Europe and among the more prosperous segments of the population in many other parts of the world may be due in part to habitual diet, particularly to high fat diets. Studies of the relationship between diet and the development of degenerative diseases not previously suspected to be nutritional in origin have been made recently in a number of countries and further research along this line is to be encouraged since there is every reason to believe that nutrition must occupy a most important place in a new type of epidemiology.

Food additives

Another problem considered in the report is that constituted by the addition of non nutritive substances to foods—substances such as colouring matters, flavouring and sweetening agents, preservatives, antioxidants, emulsifying and anti-staling agents and other additives. While many of these substances are innocuous, others may be detrimental to health. The problem is complicated by the infinite variety of its manifestations from one country to another and by the widely differing regulations which have been adopted concerning food additives. To illustrate the latter aspect of the problem, 22 countries permit certain specified colours to be added to foods, but, out of a total of 82 such colours, only one is permitted in all the 22 countries concerned.

As a first step towards co-ordinated international action, the convening of a WHO/FAO conference of representatives of groups already working on food additives together with representatives of interested member states is envisaged.

Other subjects

Other subjects covered in this report include endemic goitre, anthropometry in the assessment of nutritional status and the training of personnel for work in nutrition.

The activities of WHO with regard to the control of endemic goitre are reviewed. Particular attention is called to advances in goitre prophylaxis through new methods of iodization of salt and governments are urged to undertake studies on the prevalence and effects of endemic goitre in their countries and to institute the necessary prophylactic measures.

Interest in anthropometry as related to nutrition is increasing and the possibility that future developments in this field may prove useful in appraising nutritional status is foreseen.

There is a crucial need in many countries for trained workers in nutrition and continued international assistance to governments in

training specialists and auxiliary personnel is required. Also needed is aid in education of the public in matters of nutrition. The report includes in an annex a paper on

methods and content of education in nutrition which may serve as a guide in programmes of health education for the improvement of diet

HYGIENE OF SEAFARERS

The health of seafarers has been a matter of international as well as national concern for many years. WHO has assumed the responsibilities of the Health Organisation of the League of Nations and the Office International d'Hygiène Publique in this domain working particularly through a committee with the International Labour Organisation—the Joint ILO/WHO Committee on the Hygiene of Seafarers. The second report of this committee has recently been made available.¹

This report deals first with the question of medical advice by radio to ships at sea. On the basis of a comprehensive review furnished by the ILO of the practice and experience in various maritime countries valuable information provided by the International Telecommunications Union and statements from shipowners it is concluded that existing facilities for giving medical advice by radio to ships at sea are in general satisfactory. However the attention of governments is drawn to the desirability of ensuring that medical advice by radio should be available at any hour of the day or night, that this advice should where necessary include specialist advice and that adequate use be made of the radio advice facilities available with an up-to-date and complete list of the radio stations through which medical advice can be given being supplied to every ship.

Particular emphasis is laid on the problems of tuberculosis and venereal diseases among seafarers. Although there are not sufficient statistical data to permit drawing any

reliable conclusions concerning the incidence of tuberculosis among seafarers as compared with the rest of the population or with those engaged in other industries certain features of the seafarer's life justify his being given special consideration. In addition to the fact that in the course of duty seamen may visit places where the prevalence of tuberculosis is high there are other factors which make it desirable that particular care be taken to detect tuberculosis among them—e.g. the long periods during which adequate treatment would be impossible and the comparatively confined spaces in which ships' crews live. It is therefore recommended that all new entrants to a merchant navy be examined for tuberculosis and that periodic re-examination be encouraged through a continuous campaign of health education.

Penicillin treatment has resulted in a noteworthy decline in the prevalence of venereal diseases among seamen in a number of countries but this group of infections still constitutes a serious health problem. WHO is at present making a study of the venereal-disease treatment facilities and methods at ports and is revising the *International list of venereal disease treatment centres at ports*. It is hoped eventually to recommend a model scheme of diagnostic treatment and other control practices with regard to venereal infections among seafarers. Attention should be given to contact tracing and to the treatment of infected contacts though tracing may be difficult in the case of contacts of seafarers and would require a system of international reporting.

The report contains considerable information concerning medicine chests on board

¹ *Wld Hlth Org. Tech. Rpt. Ser.* 1955 92. 70 p. ges. Price 1s. 30.30 or Sw. f. 1.—Published in English, French, and Spanish.

ship including a discussion of their contents and purpose and lists of suggested medicaments and surgical instruments appliances and equipment. It is emphasized that the medicaments which should be carried in the medicine chest depend very largely upon the contents of a medical guide, in the absence of which some of the suggested medicaments

might be dangerous. Belgium, Denmark, Finland, France, Iceland, the Netherlands, Norway, Sweden, the United Kingdom and the USA possess authorized medical guides for the use of medicine chests at sea. Every country with more than coastal shipping trade should have a comprehensive standard guide in the language of the country.

Notes and News

Executive Board Holds One-Day Session

The WHO Executive Board met for its sixteenth session in Mexico City on 31 May, following the closure of the Eighth World Health Assembly on 27 May. In this single day meeting the Board elected its officers for the coming year: Dr S. Al Wahbi (Iraq) Chairman, Dr O. Vargas Mendez (Costa Rica) and Dr R. Mochtar (Indonesia) Vice Chairmen, and Dr Augusto da Silva Travassos (Portugal) and Dr J. J. du Pre Le Roux (Union of South Africa) Rapporteurs.

The Board decided that the Ninth World Health Assembly would meet in Geneva beginning on 9 May 1956.

It was decided to postpone until January discussion of the possible establishment of a special committee in connexion with the worldwide campaign for malaria eradication and the fund composed of voluntary contributions from governmental and private sources which is intended to aid in financing the campaign.

Blood Grouping Laboratories

The International Blood Grouping Reference Laboratory established under the auspices of WHO in 1952 is located at the Lister Institute, London, and is under the direction of Dr A. E. Mourant. The laboratory carries out the following functions:

(a) The distribution to designated national blood grouping laboratories of haemagglu-

tinating sera of known specificity and purity together with literature describing their use (*excluding anti A and anti B sera and anti C anti D and anti E sera of the Rh series*). Such distribution is subject to the receipt of suitable sera from abroad.

(b) The checking of sera submitted by designated national blood grouping laboratories, and the determination of the purity of reagents issued by them with the exclusion of those sera for which international standards exist or are in preparation.

(c) The testing of limited panels of red cells subject to prior arrangement with the designated national blood grouping laboratory concerned for the sending of each consignment.

Up to the present time the following have been formally designated by their respective governments as national blood grouping laboratories:

1 Denmark Statens Serum Institut Copenhagen

2 Ireland National Blood Transfusion Association Dublin

3 Netherlands Central Laboratory of the Blood Transfusion Service of the Netherlands Red Cross Amsterdam

4 Norway Statens Institutt for Folkehelse Oslo

5 Sweden State Chemical Legal Laboratory Stockholm

6 Switzerland Laboratoire central du service de transfusion de la Croix Rouge Suisse Berne

Review of WHO Publications

Chemotherapy of Malaria By G. Covell, G. R. Coatney, J. W. Field & J. Singh. Geneva 1955. (World Health Organization Monograph Series No. 27). 121 pages. index. Price 17/6 \$3.25 or Sw fr 10.— (clothbound).

Many scourges have played their part in influencing the history of mankind, but few more than malaria. Yet until the end of the First World War the only specific drugs in use to combat this widespread disease were the cinchona alkaloids, particularly quinine. The development of experimental malaria therapy and of synthetic antimalarials opened a new era in malariaology.

Recognizing the need for an authoritative assessment of the properties of the newer antimalarial drugs, the World Health Organization appointed Sir Gordon Covell, Dr G. Robert Coatney, Dr John W. Field, and Lieutenant Colonel Jaswant Singh to undertake this task. The result *Chemotherapy of Malaria* is a comprehensive study of all aspects from historical review to clinical application of antimalarials. Research is surveyed both from the chemical approach in which the structures of each group of drugs are demonstrated, and from the biological approach which covers the life-cycle of the parasite and the reaction of different species to drugs at various stages of their life-cycle. Individual compounds in common use are analysed for their activity, toxicity, contra-indications, absorption, plasma concentration, and elimination. Descriptions of tests for estimations of each compound in body fluids are given.

Significant drug resistance in malaria is a recent phenomenon, although in theory all forms of the parasite normally sensitive to drugs may become resistant. The authors deal with this problem in a chapter on the resist-

ance of various forms of the parasite to the antimalarials in common usage, with emphasis on proguanil resistance, and explain the origin and mechanism of drug resistance.

The dual aim of malaria chemotherapy—to cure the patient suffering from the infection and to prevent clinical manifestations of the disease—is well brought out in a chapter on the clinical use of antimalarial drugs. The treatment of different forms of malarial attacks is discussed, and the recommended drugs and suggested dosages are outlined. A section is devoted to drug prophylaxis for the individual and for the community, with special reference to its use in controlling epidemics. A summary of suggested dosages, base-contents of tablets, and physical data on salts are presented in annexes.

A bibliography of nearly two hundred selected references completes the book.

Annual Epidemiological and Vital Statistics 1952. World Health Organization. Geneva 1955. 543 pages. Price £2.10.0 \$7.50 or Sw fr 30.— Bilingual edition (English and French).

The World Health Organization has issued its new annual of statistics covering the year 1952. This volume of over 540 pages comprises 73 statistical tables which provide an extensive and varied picture of the demographic and health situation for this year in various countries of the world, in particular from the viewpoints of incidence of communicable diseases and importance of the different causes of death.

To meet the scientific needs of numerous specialists, some subjects have been treated in great detail. Thus the significance of the various localizations of cancer and tuberculosis by sex at different ages, and the seriousness of certain diseases particularly affecting

young children, can be evaluated. Specific rates of mortality from the 15 principal causes of death are shown by sex and by age, so that useful analyses and comparisons can be made.

For the first time in this series, a detailed table has been introduced demonstrating the proportion of deaths—at various ages and in each sex—concerning which no medical diagnosis was possible.

Bowlby Monograph in Spanish

Dr John Bowlby's monograph *Maternal care and mental health* is now available in Spanish. The Spanish translation *Los cuidados maternos y la salud mental* has been published by the Pan American Sanitary Bureau, WHO Regional Office for the Americas.



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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SCHEDULE OF MEETINGS

8-20 August	International Conference on the Peaceful Uses of Atomic Energy Geneva
14-27 August	Seminar on Sewage Disposal Kandy Ceylon
29 August 2 September	Consultant Group on Medical Requirements for the Licensing of Motor Vehicle Drivers Geneva
29 August 3 September	Expert Committee on Psychiatric Nursing first session, Geneva
5-8 September	Regional Committee for Europe, fifth session, Vienna
5-10 September	Regional Committee for South East Asia eighth session, Bandung
6-8 September	PASO Executive Committee twenty-sixth meeting Washington D C
7-14 September	Expert Committee on Trachoma second session Geneva
9-21 September	PASO Directing Council eighth meeting, WHO Regional Committee for the Americas, seventh session, Washington D C
12-16 September	Regional Committee for the Eastern Mediterranean fifth session Beirut
13-19 September	Regional Committee for the Western Pacific sixth session Singapore
19-24 September	WHO/FAO Joint Conference on Food Additives Geneva
19-24 September	Regional Committee for Africa, fifth session Madagascar
21 September	PASO Executive Committee twenty-seventh meeting Washington D C
26 September 1 October	Expert Committee on Drugs Liable to Produce Addiction sixth session Geneva

The mention of manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature which are not mentioned. Proprietary names of such products are distinguished by initial capital letters.

INFANT NUTRITION IN THE SUBTROPICS AND TROPICS

In any part of the world practices in infant feeding are one of the most important factors in determining the health of the whole population. Nowhere is this more apparent than in the technically underdeveloped countries of the subtropical and tropical regions where ignorance and superstition often vie with poverty and lack of suitable food in producing widespread malnutrition among infants and children.

This widespread malnutrition is a basic and increasingly urgent problem in efforts to raise the standards of health and living of the less-developed countries. It is a problem with many concomitants requiring study along sociological as well as medical lines. Assistance from outside sources may complicate rather than help the situation: old beliefs may be shaken and practices eliminated without adequate attention being given to assuring the continuity of new and more healthful substitutes. Any attempt to improve infant nutrition must be based on familiarity with local conditions and customs and means must be found to adapt present-day knowledge of healthful infant feeding methods to the circumstances in the less-developed countries of the subtropics and tropics. As Dr D. B. Jelliffe, WHO Nutrition Consultant, has written "it is useless to expect the standard Western style textbook instructions on infant feeding to have any significance for most children in these parts of the world who easily form the numerical majority of the global child population."

Dr Jelliffe, WHO Visiting Professor of Paediatrics at the All India Institute of Hygiene and Public Health and former Senior Lecturer in Paediatrics at the University College of the West Indies undertook on behalf of WHO a three month survey of

methods of infant feeding in the Eastern Mediterranean, South East Asia and Western Pacific Regions. On the basis of this survey, previous personal experience in the Sudan, Nigeria and Jamaica and a review of the pertinent literature, he prepared a study which is soon to appear in the WHO *Monograph Series*¹ on infant nutrition in the subtropics and tropics. The information that follows is drawn from Dr Jelliffe's book, in which he first describes infant feeding practices and common nutritional diseases in a number of subtropical and tropical countries and then suggests practical approaches to improvement.

INFANT FEEDING PRACTICES IN THE SUBTROPICS AND TROPICS

There is infinite variety in methods of infant feeding in the subtropics and tropics; uniformity is not to be found even within a country, district, or town, since socio-economic as well as racial and religious differences play a part in how and what an infant may be fed. A summary picture of nutritional practices and diseases in some of the countries in the regions under study is given in table I.

Certain common practices may be noted chief among them being prolonged breast feeding especially among the poorer population groups. The main reason for discontinuation of breast feeding is another pregnancy and in many countries breast feeding is usually prolonged because of the belief that it prevents a new conception.

In general animal milks play little part in the feeding of the majority of poorer infants.

¹Jelliffe, D. B. (1955) *Infant nutrition in the subtropics and tropics*, Geneva (World Health Organization Monograph Series, No. 29).

TABLE I INFANT FEEDING PRACTICES

Countries or territories	Usual weaning age	Age at which semi solids are begun	Use of animal milk	Common semi solids	Common nutritional disorders
Egypt	18-24 months	9-12 months	Buffalo milk available but not consumed	Combinations of maize with other ingredients legumes	Anaemia, rickets, beriberi, vitaminosis A
Lebanon and Syria	12-24 months	12 months	Some milk (cow or goat) used in villages usually in curdled form	Cereals (wheat, maize) and dried chick peas often prepared with sour milk	Anaemia, marasmus, rickets
Iraq	18-24 months	6-12 months	Fat free or sour milk (sheep, cow, buffalo, goat, camel) commonly used	Some cereals, herbs and bits from family fare weaning foods difficult to find	
Northern Sudan	Boys 18-24 months Girls 24-30 months	Some supplementary food from 9 months	Milk sometimes given in sweetened tea	Cooked sheep's tail, sweet potato, cooked dried meat, pre-masticated adult fare	
Saudi Arabia	24 months	Early months		Butter paste of almonds or other nuts with honey	
Morocco					
Jews	Gradual weaning		Milk used	Cheese, fish, meat soup	
Coast Arabs	Sudden weaning		Practically no milk used	Indigestible diet of bread, bread paste fried in oil, mint tea	Kwashiorkor
Berbers			Soured milk common	Goat meat	General malnutrition
Heratines				Barley biscuits and dates	Kwashiorkor
Algeria	24 months or older			Potatoes, bread, biscuits, oil, fruit and vegetables occasionally	
Pakistan	24 months or older	About 12 months	Buffalo and goat milk used	Some cereal preparations, adult food such as wheat, pancakes dipped in curry	Anaemia, marasmus, rickets
India	24-36 months	7-12 months	Cow, buffalo, goat and sometimes sheep milk used	Cereal preparations, banana, gruel, rice gruel, grams, family diet	Anaemia, vitaminosis A, marasmus, protein deficiency syndromes, rickets in some areas
Ceylon		6 months	Cow and buffalo milk used among Hindus	Rice gruel, curry	Anaemia, vitaminosis A, marasmus, protein deficiency syndromes
Burma	Prolonged	3-12 months	Traditional dishes of milk	Rice, family fare	Anaemia, marasmus, beriberi, kwashiorkor
Thailand	Prolonged	Very early	Not used to any extent	Rice, mashed banana	Vitaminosis A, beriberi
Indo-China	18-24 months	Very early		Rice, dried fish, small quantities of fruit and condiments	Kwashiorkor

TABLE 1. INFANT FEEDING PRACTICES (Continued)

Infants	Usual weaning age	Age at which semisolids are begun	Use of animal milk	Common semisolids	Common nutritional disorders
Indonesians	Variations according to racial group	Very early	Sweetened condensed milk	Excess of carbohydrate sugar and rice	General malnutrition endemic goitre kwashiorkor (except among Indians)
Sri Lankans	12-24 months	Very early		Rice, bananas, soybeans	Avitaminosis A, anaemia, kwashiorkor
Nepalese	Prolonged		Diluted condensed milk sometimes used	Rice and banana gruel sweet potato fish	Benign anaemia, marasmus, avitaminosis A, kwashiorkor
	12-36 months	From 5 months	Not common in most areas except northern China (goat milk) and Tibet (yak milk)	Gruels, cereals, eggs, dried dates	
Indonesians	18-24 months	Early	Sweetened condensed milk in some areas	Premasticated root vegetables (bitter sweet potato, etc.)	
Indonesians	7-9 months	Early	Sweetened condensed milk for flavouring	Partial feed now with corn meal porridge with sweetened condensed milk and sugar, gruels, carbohydrate root vegetables, carrot juice (some meeto cereal)	Kwashiorkor marasmus, anaemia
Indonesians	6-9 months			Millet, beans, wheat	Protein deficiency
	12 months	2-3 months	Variety little used	Pap, bean and vegetable soups, cassava, wide variety of foods, depending on area	Widespread malnutrition, including some kwashiorkor and marasmus
	12-30 months	6 months		Variety of foods, including soups, porridges, sweet potatoes, beans and family diet usually unsuitable for infants	
Indonesians	Variations	4 months		Rice and other gruels, pumpkin, potatoes, bread, bean soup	
Indonesians	Generally prolonged			Some gruels, beans, some fruit, but limited diet	Anaemia, marasmus, kwashiorkor
Indonesians	Generally prolonged			Millet, millet gruel, bananas, sweet potatoes, cassava, oil from rice	Anaemia, marasmus, kwashiorkor
Indonesians	Usually prolonged	Early	Some cow milk among the Malays	Bananas, yams, maize and millet gruels	Anaemia, marasmus, kwashiorkor

TABLE I INFANT FEEDING PRACTICES

Countries or territories	Usual weaning age	Age at which semi solids are begun	Use of animal milk	Common semi solids	Common nutritional disorders
Egypt	18-24 months	9-12 months	Buffalo milk available but not consumed	Combinations of maize with other ingredients legumes	Anaemia, kwashiorkor, malnutrition
Lebanon and Syria	12-24 months	12 months	Some milk (cow or goat) used in villages usually in curdled form	Cereals (wheat, maize) and dried chick peas often prepared with sour milk	Anaemia, marasmus, rickets
Iraq	18-24 months	6-12 months	Fat free or sour milk (sheep, cow, buffalo, goat, camel) commonly used	Some cereals, herbs and bits from family fare weaning foods difficult to find	
Northern Sudan	Boys 18-24 months Girls 24-30 months	Some supplementary food from 2 months	Milk sometimes given in sweetened tea	Cooked sheep's tail, sweet potato, cooked dried meat, premasticated adult fare	
Saudi Arabia	24 months	Early months		Butter, paste of almonds or other nuts with honey	
Morocco					
Jews	Gradual weaning		Milk used	Cheese, fish, meat soup	
Coast Arabs	Sudden weaning		Practically no milk used	Indigestible diet of bread, bread paste, dried in oil, mint tea	Kwashiorkor
Barbers			Soured milk common	Goat meat	General malnutrition
Heratinas				Barley biscuits and dates	Kwashiorkor
Algeria	24 months or older			Potatoes, bread, biscuits, oil, fruit and vegetables occasionally	
Pakistan	24 months or older	About 12 months	Buffalo and goat milk used	Some cereal preparations, adult food such as wheat, pancakes, dipped in curry	Anaemia, marasmus, rickets
India	24-36 months	7-12 months	Cow, buffalo, goat and sometimes sheep milk used	Cereal preparations, banana, gruel, rice, gruel, grams, family diet	Anaemia, avitaminosis A, marasmus, protein deficiency syndromes, rickets in some areas
Ceylon		6 months	Cow and buffalo milk used among Hindus	Rice gruel, curry	Anaemia, avitaminosis A, marasmus, protein deficiency syndromes
Burma	Prolonged	3-12 months	Traditional dislike of milk	Rice, family fare	Anaemia, marasmus, beriberi, kwashiorkor
Thailand	Prolonged	Very early	Not used to any extent	Rice, mashed banana	Avitaminosis A, beriberi
Indo-China	18-24 months	Very early		Rice, dried fish, small quantities of fruit and condiments	Kwashiorkor

often at the weaning period and frequently suffering from kwashiorkor develop xerophthalmia and keratomalacia and older children, with no signs of keratomalacia may have well marked Bitot's spots

Infantile beriberi

Beriberi a disease associated with a diet consisting almost entirely of polished rice is an important and widespread cause of infant mortality only in the rice eating areas of South East Asia. It is especially common in Burma, China, the Philippines, Thailand and Viet Nam.

Infantile beriberi is attributable to lack of thiamine in the maternal diet, which results in poor storage of thiamine during foetal life and low thiamine intake of the infant owing to negligible content in breast milk. Most babies suffering from this condition are fed exclusively on the breast, only very rarely have cases been reported in infants who are artificially fed.

Clinically infantile beriberi may be classified into three syndromes which more or less overlap: (1) acute cardiac (often occurring between 2 and 4 months) in which most of the physical signs are related to acute cardiac dilatation and failure; (2) aponic (5-7 months) which is characterized by hoarseness, dysphonia and aphonia; and (3) pseudomeningeal (most frequent in the ages from 8 to 10 months) in which the clinical picture resembles tuberculous meningitis or an encephalitis.

Rickets

Rickets a disease caused by lack of vitamin D is contrary to general belief far from rare outside the temperate zone. In fact the somewhat paradoxical situation has been reached in which the disease is now more prevalent in parts of the subtropics and tropics than it is in the temperate zone where effective prophylaxis in the form of fish liver

oil or vitamin concentrates compensates for the lack of vitamin D which might be obtained from irradiation of the skin by the sun. Rickets appears to be common in Pakistan, India, some Eastern Mediterranean countries (e.g. Israel, Syria, and Lebanon) a few areas in tropical Africa and some regions in South America.

Rickets in tropical infants may be due to a number of factors such as maternal malnutrition (e.g. lack of dietary means of compensating for non-exposure to sunshine such as occurs among women in purdah), lack of exposure to the sun, diet, diarrhoea (which may interfere with absorption of vitamin D and calcium) and lack of formation of provitamin. Dr. Jelliffe provides an explanation for the factor most difficult to comprehend as concerns tropical people—lack of exposure to the sun.

Despite the constant sunshine in many towns in the subtropics and tropics infants do not receive much irradiation with ultra violet light since especially in older walled cities houses are crowded together with dark alleys and courtyards. Babies may be so swaddled that practically no skin is exposed, or they may be somewhat over-clothed, and are carried slung in a wide cloth on the mother's back, as is the practice among the Yoruba of Ibadan town in Nigeria.

He also passes on a suggestion by B. S. Platt (personal communication) regarding lack of formation of provitamin, a subject which needs further investigation.

I have a hypothesis on this subject which is that vitamin-D deficiency may be secondary to deficiency of vitamin A or of essential amino-acids, which in turn leads to follicular keratosis. My view is that vitamin D is formed on the skin, not in the skin, because presumably the precursors of vitamin D would be in the blood stream and the small blood vessels are so far below the skin surface that light of the wave length required to convert the precursors to vitamin D would not reach the blood. I think the precursors of vitamin D are more likely to be found on the skin in sebaceous secretion, irradiated there and then absorbed, the whole process being analogous to that which is known to occur in birds and which has been established for chickens, which take oil from the

in the subtropics and tropics. When fresh milk is used, it is nearly always greatly adulterated. Sweetened condensed milk is employed in some areas, especially in towns, because of its keeping qualities, but its principal purpose is for flavouring rather than for its nutritional value.

Eggs seem to be the object of more prejudices and superstitions than any other food and are little used in infant feeding.

Although semi solids are introduced very early in certain areas (e.g. in Malaya and some adjacent countries where rice is given in the first days or weeks of life) usually they are begun between the sixth and twelfth month with many variations from one place to another, as table I indicates. Frequently the change to an almost adult diet is abrupt. Nearly always the infant is given the softest starchy portion of the adult diet as his first food and this may be very unsuitable and indigestible. There is a tendency to keep the infant on a single, monotonous predominantly carbohydrate food, even if other foods are available.

NUTRITIONAL DISEASES

Many infants in the subtropics and tropics start life with a nutritional handicap, birth weights are generally low because of the malnutrition of the mothers. The rate of growth of the infant is often satisfactory during the first six months or so when breast milk is abundant and adequate for the infant's needs, but from that point on there is a deterioration largely because of the mother's inability to meet the increasing nutritional requirements. The infant becomes subject to a host of nutritional disorders owing principally to the difficulty of obtaining suitable weaning foods especially those containing essential protein.

Nutritional anaemia

'Hypochromic iron deficiency anaemia (sucking anaemia)' is common during

infancy all over the world and in most of the subtropics and tropics is so widespread as to be almost universal. The importance of the disease as a debilitating factor cannot be overestimated."

Iron deficiency often has its origin in intra uterine life. Normally the foetus receives 300-500 mg of iron from the mother during foetal life, via the placenta from the maternal serum iron. If as often happens the poorly nourished mother is unable to provide the necessary stores of iron for the foetus the newborn infant has to draw upon dietary sources for additional haemoglobin formation during the ensuing months of rapid growth and, since his diet is usually limited to milk, which is low in iron content, a deficiency of iron results. Another factor which may play a part in this deficiency is poor absorption caused by a variety of different conditions such as chronic gastroenteritis, changes in the intestinal epithelium in malnutritional states such as kwashiorkor and the presence of severe ascariasis or any infection which produces a transient hypochlorhydria.

Other nutritional deficiencies may also contribute to anaemia in infancy in the tropics—e.g. lack of protein of good biological value, or possibly of ascorbic acid.

Avitaminosis A

Avitaminosis A is prevalent in some tropical areas especially in South East Asia. It is rampant in India and Indonesia and 60% of the blindness in Ceylon is estimated to be the result of earlier keratomalacia associated with vitamin A deficiency.

The effects of lack of vitamin A in infancy and early childhood are manifested particularly in the development of certain ocular syndromes. Babies in the first six months of life develop an acute and rapidly progressive keratomalacia, presumably because of poor intra uterine storage of vitamin A and a low vitamin A content in the breast milk. Infants

The clinical picture includes the following (1) growth failure manifested by low body weight and decreased length (notwithstanding the co-existence of oedema and in some cases of excess subcutaneous fat) and by a delayed bone age as judged by radiology of the wrist joint

(2) mental changes including apathy and peevishness with degeneration to a "vegetable like condition" in advanced cases

(3) oedema beginning on the feet and lower legs and then involving in some cases the backs of the hands the thighs the sacrum back arms and face

(4) liver changes including fatty infiltration and possible hepatomegaly

(5) gastro-intestinal symptoms such as anorexia and vomiting and usually loose and rather bulky stools containing undigested food

(6) dyspigmentation affecting either the skin or the hair or both

(7) dermatosis including a characteristic rash known as "flaky paint" dermatosis and certain skin lesions

(8) anaemia a common but not invariable feature

(9) avitaminoses manifested by signs such as xerophthalmia keratomalacia, angular stomatitis acute glossitis and stomatitis and desquamation at the outer canthi

Kwashiorkor which is the most common nutritional problem of tropical childhood may be traced in most cases to shortage during the weaning period of suitable easily digestible foods containing protein of good biological value and to the social customs and ignorance that are responsible for failure to make proper use of those protein rich foods which are available. A contributing factor is infection especially gastro-enteritis

Marasmus

"Marasmus" is a term used to describe the condition of infants suffering essentially

from starvation from actual deficiency of calories. The clinical picture which it presents is one of a "markedly underweight infant, with atrophy of both muscles and subcutaneous fat and with a wizened shrivelled monkey like face". Oedema is unusual and always minimal. There may be signs of associated avitaminoses.

It is sometimes difficult to draw a line between kwashiorkor and marasmus. Both syndromes can be considered in relation to protein deficiency kwashiorkor being protein deficiency with caloric sufficiency from carbohydrate foods and marasmus being protein deficiency together with a deficiency of calories.

METHODS OF IMPROVING INFANT FEEDING IN THE SUBTROPICS AND TROPICS

As has been previously suggested planning improvements in infant feeding practices in the subtropics and tropics must begin with an investigation of the methods actually employed. Practices which may seem strange and inadvisable must be examined objectively against the background of the living conditions of the people. For example failure to realize that prolonged breast feeding is a biological necessity in many areas might lead to advice which if followed could have disastrous consequences. And other practices which at first view seem undesirable may upon further observation and reflection be recognized as less harmful than possible alternatives. For instance mastication of carbohydrate foods followed by feeding of the infant with the finely chewed ptyalin reinforced paste may be less bacteriologically dangerous than the preparation and serving of foods in unclean utensils in squalid surroundings.

Dr Jelliffe emphasizes the necessity of adapting infant feeding methods to the existing conditions.

Any measures designed to improve methods of infant feeding must be based on a realization of the

glands and apply it to feathers where presumably it is irradiated and absorbed

Generally speaking rickets may be regarded as a debilitating and possibly deforming disorder in tropical infants but not as a major cause of infant mortality. Usually it is healed in later childhood as more exposure to sunshine becomes the rule.

Kwashiorkor

Kwashiorkor may be tentatively defined as a nutritional syndrome almost entirely confined to the late breast feeding weaning and post weaning

phases of life due to the deficiency during this very active growth period of protein of good biological value—that is containing the essential amino-acids and incidentally vitamin B₁₂ and other factors, known and unknown present in animal protein—associated at the same time with a relatively normal, or even excessive caloric intake in the form of carbohydrate.

This nutritional disorder has been observed with varying degrees of frequency in most subtropical and tropical countries and in some European countries during periods of unusual food shortage.

FIG 1 KWASHIORKOR



Left "sugar baby" Kwashiorkor in an infant showing misery, oedema, blubbery, excessive subcutaneous fat, moon face and hypochromotrichia. Right the same infant after six weeks' treatment with skimmed milk showing loss of oedema, general alertness, disappearance of rash and normal hair growing from the roots. (Mono Jamaica)

malacia and rickets are common. If needed additional calcium may be supplied in the form of medicinal lime water. In areas where vitamin A deficiency is common in infancy mothers should be made aware of the significance of carotene-containing foods particularly since the adult is probably a much better converter of carotene to vitamin A than is an infant. Finally prevalence of infantile beriberi indicates a need to supply adequate thiamine (in the form of undermilled or parboiled rice or as legumes) to pregnant and lactating women.

Breast feeding

Poorly nourished mothers seem often to initiate and carry on breast feeding more easily than better fed women in more privileged socio-economic groups. However the effect of prolonged lactation on inadequately nourished women particularly from the standpoint of drain of protein is a subject which still requires considerable investigation.

Breast feeding in the subtropics and tropics usually begins on the day of birth although the neonate probably requires no food for the first 24-48 hours; there is no reason why this practice should not be continued at least in the normal baby.

Dr Jeffiffe adds an interesting note concerning supplementary fluids during the early post natal period.

Fluids as such are not usually required in the first few days but in very hot weather boiled water or coconut water may be given. (In this context it may be noted that the latter when taken direct from the fruit is a sterile solution containing 2.5% sugar and with salts present in amounts somewhat similar to those found in human intracellular fluid.)

Most mothers in the subtropics and tropics seem to feed their infants at all times of the day and at haphazard intervals more or less following the present trend in Western style paediatrics towards "self-demand" feeding. No attempt to alter this system seems neces-

sary since it is "obviously functionally successful" and since "the fundamental test of whether a method of infant feeding is satisfactory is whether it works or not."

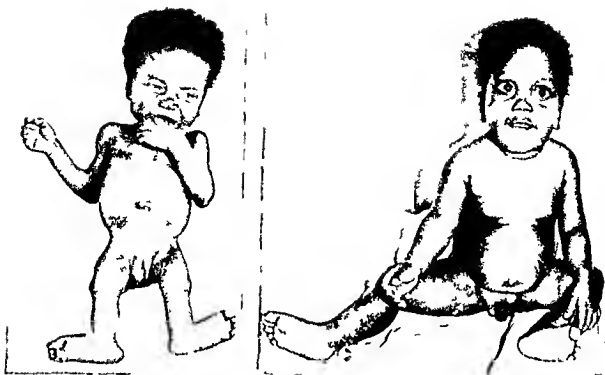
Prolonged breast feeding is essential for the growth and quite often for the survival of the majority of infants in the subtropics and tropics. Breast milk is in fact the "only easily available source of protein of good quality containing all the essential amino-acids." Beyond the age of six months however the infant requires additional food although breast feeding should be continued as a means of providing a vital protein supplement to the other foods. As an approximate gauge it is advised that breast feeding be continued up to at least two years.

Obviously maternal nutrition must be given due attention during lactation every effort being made to ensure a good diet.

Introduction of semi-solids

Contrary to infant feeding practice in other parts of the world the introduction of semi-solids during the first six months of infant life cannot be recommended in the subtropics and tropics because of the tremendous danger of gastro-enteritis. Breast feeding alone is the method of choice for the first six months.

As in the temperate zone the first semi-solid foods in the tropics are usually starchy gruels and pastes. These gruels or pastes may be composed of rice, maize, oatmeal or wheat—or alternatively crushed cooked plantain, sweet potato, Irish potato or raw ripe banana. The banana occupies a unique position: it is the only food of caloric value which can be given to the infant uncooked and in an originally bacteriologically uncontaminated condition. Slightly unripe the banana contains 12.8% of relatively indigestible starch and 11.6% of sugar; fully ripe with brownish spots on the skin it shows a change in composition—1.2% starch and



Left nutritional marasmus in an infant showing wasted muscles absence of subcutaneous fat and normal hair Right the same infant after three months treatment (Mona Jamaica)

stark simplicity of most tropical houses and must also take into account the impossibility of storing food the expense and frequent scarcity of fuel and the minimum number of unelaborate cooking pots. Any over-complicated advice envisaging the use of sterilized feeding bottles and of precise measures and percentages of different foods is completely unreal unpractical and impossible. In most instances food for the infant is prepared at the same time and in the same pot as the adult diet. In many places there is an inadequate realization that infants are best suited by specially prepared foods. A minor and rarely stressed but important piece of practical advice is to suggest that the mother obtain a small cheap earthenware or iron cooking pot in which she can prepare foods intended solely for the infant

Maternal and foetal nutrition

Since infant feeding begins in utero attention must first be given to the nutrition of the pregnant woman. It is imperative that the mother be as well nourished as possible

especially during the last three months of pregnancy, when most of the foetal storage of essential elements takes place. The dietary advice given must be based on knowledge of local conditions food customs and prevalent infantile disease. In general emphasis should be placed on adequate rest and on the fact that calorific needs are probably increased by as much as 20% in later pregnancy.

Particularly important is maternal protein intake. Use should be made of the available animal protein and this should be reinforced with plant protein foods. Iron deficiency should be guarded against by providing suitable iron containing foods such as green leafy vegetables and by supplementing the iron intake through administration of ferrous sulfate tablets if necessary. Green leafy vegetables also help to supply calcium which is especially important in areas where osteo-

essential to the child providing vitamins iron and thiamine by "artificial means when this is required. In addition he draws attention to a number of practical measures and common foods which are probably too often neglected.

With regard to the prevention of iron deficiency Dr Jelliffe notes the value of maximal drainage of blood from the placenta at birth quoting McLean

Regardless of the nutritional state of the mother there is another prophylactic procedure which should be carried out in order to assure the infant his rightful supply of iron. This procedure consists of allowing the umbilical cord to cease pulsating prior to its severance following delivery. This measure will increase the infant's blood supply by about 100 cc. and will thereby add about 45 mg. of iron to the body store. The importance of this procedure can be appreciated when it is realized that this amount of iron is about twice the amount which the average infant retains from his diet during the entire first six months of life.

Dr Jelliffe adds that the flow of blood can be facilitated by placing the baby below the level of the placenta and that "stripping" of blood by massaging the umbilical cord may be helpful if the circumstances of the labour do not allow the 5-15 minutes necessary for the transfer of the placental blood.

Another interesting point is made with reference to iron deficiency: the iron content of foods may often be augmented by cooking them in an iron pot. It has been reported that stewed apple cut up with an iron kitchen knife and hoiled in an enamelled iron saucepan which was slightly chipped became as good a source of iron as best roast beef and that the iron content of various Bantu foods—including maize "cow peas" and "sugar beans"—was greatly increased after boiling in iron cooking pots.

Carotene containing foods should be given to infants soon after six months to help in preventing avitaminosis A. Some of the foods suggested for tropical countries are pawpaws

mango juice pumpkin red palm oil yellow sweet potato bananas and green leafy vegetables. The pawpaw tends to be rather neglected as a valuable food although it grows easily in most tropical countries. It can be given to infants as an uncooked pulp and it supplies vitamin C as well as vitamin A.

For the prevention of rickets the simplest and least expensive measure for both mothers and infants is irradiation of the skin with sunlight—a measure which never seems to be advised. This might prove somewhat difficult in "overcrowded old-fashioned Oriental cities" where the mothers are often in purdah but some suitable technique of sunbathing should be able to be devised. Dr Jelliffe suggests that exposure of the back alone might meet the purpose. Witness to the practicality of obtaining vitamin D directly from the sun is the very low incidence of rickets among rural tropical children as compared with that among children living in towns in the same regions.

In giving advice aimed at the prevention of marasmus attention must be paid to the necessity of prescribing protein as well as carbohydrate test, in preventing marasmus kwashiorkor be developed.

To prevent kwashiorkor the best possible use should be made of all available animal protein with particular attention being given to ways of employing fish for infant feeding of "stretching" the available milk by mixing it with gruels etc. and of using chicken or turtle eggs. Inasmuch as supplies of animal protein are apt to be quite inadequate in most subtropical and tropical countries plant protein foods assume great importance and certain practical principles should govern their choice and use.

First, if there is any possibility of choice so far as the initial starchy gruel or paste is concerned, the one with the highest protein content should be used—as for example rice in preference to banana. In addition, practical observation has shown that some plant foods appear to be less commonly associated with the development of kwashiorkor than others.

19.5% sugar, which is easily digested and absorbed by the infant

Animal milk in infant feeding

Milk plays such a dominant part in present day infant feeding in Europe and North America that it is difficult for anyone brought up in those parts of the world to realize that it is not a necessary food stuff for any age group and that in fact children have been and are habitually reared in many Mongolo-Malayan countries and on some Pacific islands without milk being used at all. This Western attitude has been termed milk emotionalism with milk having an almost magic significance.

Despite the facts that milk is not essential for successful infant feeding and that it plays little part at present in infant feeding methods in the subtropics and tropics any milk which may be available should be used to the best advantage, especially during the potentially protein deficient phase of later infancy. Milk is an excellent source of protein of good biological value and is probably the best protein weaning food.

In countries where fresh animal milk is not a habitual food, mothers may be encouraged to use it, although nutritional advice should first be concentrated on making better use of traditional infant feeding methods and foods. Where milk is already a common food efforts should be made to increase both the production and conservation of it. It should be emphasized, however, that animal milk in the tropics is often dangerous and nutritionally variable, since it is usually subject to contamination, dilution with water or adulteration with various substances—maize flour, for example.

Sweetened condensed milk is sometimes used in the tropics since it keeps well without refrigeration owing to its high sugar content. In general its use is misused, and the results are far from satisfactory. The fat which it produces in infants sometimes disguises underlying malnutrition, only small amounts can usually be afforded so that it is very frequently used largely as a flavouring

rickets and avitaminosis A are sometimes associated with its widespread use (its content of vitamins A and D is usually very low) and babies may become addicted to the sweetness and refuse to take the breast, with a resultant failure of lactation. When other forms of milk or protein weaning foods are not easily available however, there may be a place for sweetened condensed milk provided it is used in appropriate dilution (17).

Because of its comparative unavailability and high cost dried powdered milk plays a very minor part in infant feeding in the subtropics and tropics. However in recent years free or subsidized dried milk has begun to be distributed as part of the activities of maternal and child health (MCH) centres. But Dr Jelliffe points out that this practice presents numerous difficulties.

The future development of powdered skimmed milk distribution is uncertain. The fundamental problem would appear to be how to make the best use of the available cheap protein rich skimmed milk powder from the milk surplus countries in feeding the millions of protein deficient children in various tropical countries while at the same time not overwhelming the MCH centres with milk distribution duties or interfering with their primary function of teaching mothers and junior staff how to use available local resources to the best advantage. Moreover fresh hazards to the health of the child may be created by the introduction of a new strange and uncontrollable foodstuff. It seems desirable that free or subsidized powdered skimmed milk should be distributed selectively—that is primarily to countries where the need is greatest, the milk habit is already established and an extension of dairying is practicable in the near future or the continued importing of subsidized skimmed milk on a large scale is a feasible proposition owing for example to the relative nearness to milk surplus countries.

Prevention of the main nutritional diseases

In considering the prevention of the nutritional diseases common among infants in the subtropics and tropics Dr Jelliffe again stresses the importance of supplying pregnant and lactating women with the food elements

when the WHO aided project began. However the WHO consultant undertook certain experimental work in collaboration with the national campaign to determine the optimum dosage of DDT and the cycles of spraying best for Ceylon. Three villages were sprayed each with a different dosage of DDT and a fourth was left unsprayed as a check area. This experiment showed that the only malaria vector of Ceylon *Anopheles culicifacies* could be controlled by DDT residual spraying at a dosage of 2 g per m² (200 mg per sq ft) in two or more applications depending upon the local situation—i.e. two sprayings per year in areas where walls and roofs were not subjected to replastering or changing and four sprayings where structures were repaired frequently or where new construction was common.

Studies were made of the bionomics of the vector particularly of its resting habits. Other investigations including those relative to time of entry and exit from buildings, longevity and feeding habits were planned by Professor Chow and were subsequently carried out by the entomologist of the national antimalaria campaign.

Filaria control

With effective control of malaria having been achieved filariasis has become the principal insect borne-disease problem in Ceylon. Two types of filariasis are present: the urban type caused by the parasite *Brugia bancrofti* and the rural type caused by *B. malayi*.

The vectors of rural filariasis in Ceylon are *Mansonia* mosquitoes particularly *M. uniformis*. Since *Mansonia* mosquitoes breed in association with certain aquatic plants especially water lettuce (*Pistia stratiotes*) various means of ridding the affected areas of these plants were tried. Pistia clearance by manual removal proved both expensive and unsatisfactory but excellent control by

herbicides was achieved. *Salvinia* (water fern) another host plant of the *Mansonia* was also effectively controlled by chemicals. Details of the results of the experiments with herbicides against both of these aquatic plant hosts have been reported in the *Bulletin of the World Health Organization*¹.

The vector of the urban type of filariasis is *Culex fatigans* and this mosquito was studied for more than two years in Kurunegala. Field observations showed that DDT indoor residual spraying failed to control this vector. BHC and dieldrin were also tried but no conclusive results could be obtained. It was concluded that adulticides were an unsatisfactory means of control; that fundamental sanitary measures (e.g. installation of proper systems of drainage and sewerage) were essential to effective control and that larvicides were the method of choice until the general sanitary situation could be improved. Of the locally available larvicides tested dieldrin and BHC appeared to be the best.

Housefly control

While general sanitation is also of primary importance in the control of the housefly, insecticides may be used as a supplementary measure if necessary. Professor Chow devised a simple and effective means of housefly control—a portable frame supporting strings soaked in insecticide. This device gave a much greater chance for the housefly (which does not commonly rest on places which are subjected to residual spraying) to contact the insecticide residue. Dieldrin emulsion was found most satisfactory for use on the frame both in the laboratory and in the field. The residual effect seemed to last at least two and a half months. Details of this experiment have also been published in the *Bulletin of the World Health Organization*².

Chow C. Y. (1953) *Bull. Wld Hlth Org.* 9: 571. Chow C. Y., Thev sagayam, E. S. & Wambeck, E. G. (1955) *Bull. Wld Hlth Org.* 12, 365.

Chow C. Y. & Thev sagayam, E. S. (1953) *Bull. Wld Hlth Org.* 9: 491.

in this context wheat and rice are better than maize and sweet potato than cassava

A very important principle which can be applied to infant foods as well as to the adult diet is that of using plant protein mixtures so that individual deficiencies of amino acids may be mutually made good cereals are usually poor in lysine but rich in methionine while the converse is true of beans peas and legumes consequently it is obviously beneficial to take these two classes of foods mixed together so that the essential amino acids they contain will all be simultaneously available

Legumes in particular, are a valuable source of plant protein, usually containing from 20 % to 25 % of protein together with appreciable quantities of thiamine, riboflavin calcium and iron Various combinations and preparations of legumes many of them based on soya beans are being tried as infant weaning foods in subtropical and tropical countries

NUTRITION EDUCATION

To modify the ideas and so improve the practices of people as to how they nourish

themselves and their children is no easy task, yet this is one of the fundamental problems in improving infant nutrition in the subtropics and tropics Among all peoples there are beliefs about certain foods which have little basis in fact The food ideology of the people concerned as well as the nutritional resources and needs must be studied before any type of improvement can be planned

The health worker whose aim is to help improve nutrition must therefore begin by acquiring the necessary background information by familiarizing himself with local customs and conditions as much as possible He can then turn to the task of presenting his ideas and facts to the people in such a way that they will be acceptable Two basic principles are to work with the people rather than for them, and to key all efforts at improvement to the local conditions so that what is proposed may be both practical and self perpetuating

CONTROL OF INSECT-BORNE DISEASES IN CEYLON

WHO-Aided Project

At the end of 1954 Professor C Y Chow WHO entomologist ended an assignment in Ceylon which had begun in late 1951 During this period he had helped to expand the activities of a training centre for the control of insect borne diseases (established in 1939 as a malaria field training centre) to train local personnel in entomological techniques and to carry out research on methods of control of the insect borne diseases prevalent in Ceylon Professor Chow's final report records the accomplishments of this three year project

Training

Training was given to 350 persons ranging from medical officers to apothecary stu-

dents The type and length of instruction varied according to the group—e.g., graduate entomologists and entomological assistants received three to four months of training medical officers of health four to six weeks public health inspectors for filariasis control three weeks public health inspectors and divisional revenue officers one week public health inspector learners three days apothecary students one day Professor Chow prepared a training manual on insect borne disease control and made use of films slides insect specimens and charts in his teaching

Malaria control

Malaria was already being effectively controlled by a national anti-malaria campaign

The information which follows is drawn from Professor Petrik's reports

UNDERGRADUATE EDUCATION

USA

At least nine schools of engineering in the USA offer undergraduate courses in sanitary engineering: the Massachusetts Institute of Technology and the engineering schools of the following universities: California, Illinois, Michigan, Wisconsin, Johns Hopkins, Tulane, Cornell and Purdue. A separate department of undergraduate training in sanitary engineering exists at the Massachusetts Institute of Technology and at the University of Illinois.

Undergraduate courses in sanitary engineering usually come within the curricula of civil engineering. Among the subjects commonly covered are water supply and sewerage, water supply and treatment, sewage disposal and treatment, environmental sanitation, sanitary engineering laboratory chemistry or analysis of water and sewage, sanitary engineering design, hydrology and bacteriology. Less common but included in the curricula of some schools are biology and microbiology, plant operation, industrial waste treatment, public health administration, epidemiology, biostatistics, hydraulic engineering and city planning.

Europe

Sanitary engineering is included to some extent in all undergraduate training in civil engineering in continental schools. The most common subject is water supply and sewerage, which may be a separate course or part of a larger course in hydraulic engineering. Other subjects which may be taught are water and sewage treatment methods, the chemistry and biology of water, industrial hygiene, town planning and housing, heating, ventilation and air conditioning. In no case

does undergraduate training cover the entire field of sanitary engineering: there is seldom any instruction in food control, and little instruction in vector control or in occupational sanitation and the hygiene of housing. Nowhere is there a separate subdivision of sanitary engineering; at best there is an option of sanitary engineering subjects in the highest semesters, as in Delft and at the largest Yugoslav engineering schools.

In general, the undergraduate training of civil engineers in Europe tends to be conservative in character and a separation of sanitary engineering from civil engineering to be looked upon with disfavour. Even changes or the introduction of new courses may often meet with the greatest obstacles, and sanitary engineering subjects of a more or less non-technical nature may have to be "brought in by the back door" by inserting them in official courses on hygiene.

In Great Britain and in Ireland, undergraduate training is usually of a general character, with specialization confined to postgraduate studies. Consequently, not many subjects of sanitary engineering appear in the undergraduate curricula.

POST GRADUATE EDUCATION

USA

There are two types of postgraduate education in sanitary engineering in the USA: one is training in the schools of public health designed to prepare students for work in public health services, and the other is training in engineering schools concentrating on design, construction and consulting work.

In the first kind of training, given in ten of the accredited schools of public health (California, Columbia, Harvard, Johns Hopkins, Michigan, Minnesota, North Carolina, Pittsburgh, Tulane and Yale), emphasis is laid on the basic public health courses—e.g. epidemiology, communicable

In certain localities in Ceylon, houseflies developed resistance to the chlorinated hydrocarbon insecticides particularly to BHC and dieldrin, this problem was studied by Professor Chow and his co workers. The organic phosphorus group of insecticides was subsequently to be tried for housefly control in the localities where resistance to the chlorinated hydrocarbons had been observed.

Head louse control

A survey was made of head louse infestation among schoolgirls from 4 to 21 years of age in the urban area of Kurunegala. Over 90% of them were found to be infested with nits and between 50% and 60% with head lice. The age group 11-15 years was most affected.

A comparative study of Lorexane (1% gamma BHC) and Ascabiol (25% Benzyl benzoate) was made. The former was shown to be far superior to the latter, and to be much less expensive as well.

Project results

Professor Chow, at the end of his assignment left a training centre which had been greatly expanded and improved staff prepared to continue the work, and valuable knowledge of the best methods of controlling insect borne diseases in Ceylon. The field research which had been conducted under his supervision had modified the public health methods in practice and had in some cases drastically reduced the costs of controlling diseases which were a major health problem in Ceylon.

THE EDUCATION OF SANITARY ENGINEERS

European Symposium

Today one cannot imagine an efficient public health organization, that is an integrated public health service, which does not give a proper place to the sanitary engineering services performed by a qualified sanitary engineer assisted by the necessary auxiliary personnel.¹ Yet in most countries there are few, or no sanitary engineers and no facilities for training them.

In recent years WHO has done much to focus attention on the basic importance of environmental sanitation and to stimulate interest in the development of sanitary engineering as an essential part of public health services. Among other relevant activities has been the sponsorship of four seminars for European sanitary engineers, the first of

which was held in 1950. These seminars made apparent a need to review the situation with regard to the education of sanitary engineers in Europe to study the problem of how more sanitary engineers could be trained to meet the demands of countries both within and outside Europe and in connexion with the work of WHO. Consequently, the Regional Office for Europe organized a symposium on the education of sanitary engineers held at Oxford from 2 to 7 April 1955.

In preparation for this symposium Professor Milivoj Petrik of the University of Zagreb made a survey of education in sanitary engineering in Europe and the USA. It was thought advisable to include the USA because it is one of the few countries in which the sanitary engineer has been given a prominent place in the public health team.

¹ Stampar A. (1955) *The role of sanitary engineers in public health work* (Unpublished working document EUR/S Eng Trg/6)

Most of the courses are open chiefly to civil engineers though at Zagreb chemical and mechanical engineers or architects may be admitted but have to follow the option of the curriculum best fitted to their previous studies

Post graduate training in sanitary engineering is also given at the Institut de Technique Sanitaire of the Conservatoire National des Arts et Metiers at Paris where a two-year course is arranged for evenings only four days a week two hours a day for students who are occupied during the day in their usual work. The curriculum covers the entire field of environmental sanitation except food hygiene with a view to work in rural and tropical conditions and is carried out by prominent teachers

There are two more types of post graduate studies in sanitary engineering in Europe not connected with formal courses. One is short term or refresher courses such as have been given at the Engineering School at Delft the Institute of Hygiene in Lisbon and the Institute of Hygiene in Belgrade. The second type is post graduate research work in sanitary engineering subjects in university institutions which may lead to a doctorate. Activity of this kind is found in Great Britain Zurich Liège Stuttgart and Naples. Similar in character and in effect is post graduate work of an equally free nature for the degree of "licentiate" in the engineering schools of Copenhagen and Helsinki.

Preparations are being made for regular post graduate education in sanitary engineering at several schools of engineering—e.g. Zurich Delft Stuttgart Milan and Istanbul

THE SYMPOSIUM

The symposium participants defined sanitary engineering (or public health engineering as it is called in some countries) as "the control by engineering means of man's physical environment so as to promote his phy-

sical mental and social well being". They stressed the importance of the sanitary engineer's functioning as part of the health team and noted that as yet there is not sufficient recognition in Europe of the necessity for having highly trained sanitary engineers in their "rightful place in the public health administration at various levels". In addition they called attention to the need for sanitary engineers in under developed countries all over the world.

Recognition of the need for sanitary engineers could aid in promoting adequate educational and training facilities. In most European countries educational facilities are available for specialist engineering training in sanitation but they do not provide the broad approach to sanitary engineering which is particularly important in the training of sanitary engineers for work in the less developed countries.

The preparation of the sanitary engineer should include at least one year of full time academic post graduate education in the subject. This training has been found to be especially effective if it takes place after some years of engineering experience. Appropriate practical experience should in any case be part of every course.

Where full time academic instruction is not possible part time post graduate instruction encompassing the same material and extending over not more than about two years may be regarded as an acceptable compromise provided that it occupies the same total instruction time and includes the same practical work.

While undergraduate instruction can never be considered a substitute for post graduate education it is of value. It may range from a descriptive treatment of for example water supply and sewage disposal to a very much fuller treatment of sanitary engineering including some of the background non engineering subjects. It would be of benefit if instruction in all branches of engineering

parasitic and occupational diseases, bacteriology, biology and microbiology, parasitology, entomology, physiology, principles and practice of public health, sanitation, vital statistics, industrial and occupational health, and the organization and administration of public health services. The purely engineering subjects come in second place.

Although all the schools aim at preparation for the general and average requirements of public health services, some stress service under special conditions—e.g., Columbia, public health administration in the tropics, Tulane, work in warm climates, and Harvard work in industrial and occupational health and on microclimatology. There are no engineering courses proper in the curricula of the schools of public health of Pittsburgh, Tulane, and Yale.

The wide variety of courses available in most of the schools offers possibilities for giving particular attention to a great number of special problems, but the best opportunities are in water and sewage engineering. The training as a rule, comprises one academic year and leads to a Master's degree. It is usually composed of a restricted number of compulsory courses, mostly in basic subjects, with a number of elective courses which may cover all engineering subjects.

The second type of training is given in schools of engineering, such as the Massachusetts Institute of Technology or the relevant schools of the following universities: California, Harvard, Illinois, Michigan, Minnesota, Texas, Wisconsin, Cornell, Johns Hopkins, New York, and Purdue. In these schools training is concentrated, naturally, on engineering subjects, particularly on water and sewage engineering. Instruction in basic subjects of public health is usually restricted to general courses in public health, sanitary engineering, or sanitation, and in sanitary chemistry and biology. All the twelve schools have general courses in sanitary engineering, and about half of them courses in sanitary

chemistry and biology. There are occasional courses in industrial or occupational sanitary engineering. Harvard University and New York University offer the possibility of specializing in industrial sanitary engineering. No school offers separate courses in food sanitation, only one offers special courses on animal vectors, and courses on housing and town planning are rare.

In addition to graduates in civil or sanitary engineering, those in chemistry or biology may be admitted for post graduate study at the engineering schools.

There is great fluidity in the curricula of the various schools in the USA, which makes experimentation possible and facilitates evolution and progress.

Europe

Regular and full time post graduate training in sanitary engineering is given at only five universities in Europe: the Engineering Faculty of the University of Naples, the Imperial College (London University), King's College of the University of Durham, the Faculty of Applied Science of the University of Liege, and the School of Public Health of the University of Zagreb.

Water and sewage engineering is the core of all the courses, which require a complete academic year. In all of them the whole of the curriculum is compulsory, without any optional subjects, except at Zagreb, where the curriculum is adapted to the various kinds of engineers admitted to the course. Laboratory work, elaboration of a major project, field work, and excursions are part of all the curricula. Some subjects are common to all five courses, but generally speaking, each programme is designed to meet the specific needs of the countries served. The Naples and Zagreb courses are national in character, whereas the British courses are based on Commonwealth needs and are therefore suited to train students from different countries.

(3) improvements in diagnostic techniques and case finding

The situation in the countries included in this study may be briefly summarized as follows

Federal Republic of Germany There has been an increase in death rates of 40% in men as compared with 29% in women. The main rise took place for both sexes at the age of 50 years or older

England and Wales Practically no increase for either sex in fatal cancer of the nose, nasal cavities, middle ear, sinuses, larynx, etc. has been noted. Yet deaths from cancer of the lung, trachea, and bronchial tubes have climbed steadily by about 31% in males and 21% in females. The principal increase

occurred in the age group 50-80 years, especially in men

Scotland A 36% rise in mortality from cancer of the respiratory system is recorded for men for the period 1949-52, but no appreciable increase is observed for women

Denmark Here mortality rates are less than half the corresponding ones in England and Wales, yet death rates from cancer of the respiratory system have increased by 49% in males and 51% in females during the brief period of four years. The rise occurred almost entirely in the age group 45-85 years

Ireland Although mortality rates for cancer of the respiratory system are not high, they have increased by 47% in males and 62% in females

TABLE 1 INCREASE IN DEATHS FROM ALL FORMS OF CANCER AND FROM CANCER OF THE RESPIRATORY SYSTEM FROM 1935-38 TO 1950-52

	Percentage increase of mortality from cancer of all kinds to all ages		Percentage increase of mortality from cancer of the respiratory system for all ages	
	Men	Women	Men	Women
Union of South Africa	15	12	148	144
Canada	23	4	197	54
United States	31	6	183	77
Denmark	19	6	237	106
Finland	35	21	137	153
Ireland	15	15	223	103
Italy	32	20	196	141
Norway	17	13	233	50
Netherlands	15	1	69	29
United Kingdom				
England and Wales	75	8	174	83
Scotland	31	9	229	86
Northern Ireland	24	5	133	36
Switzerland	7	11	101	70
Australia	6	7	149	65
New Zealand	27	18	172	49

could include, at an early stage, a short series of lectures on the social, and especially the health, implications of engineering

Short courses are a useful means of bringing up to date the knowledge of practitioners in sanitary engineering. Such courses may be provided by universities, professional associations or other institutions.

The most suitable and most common undergraduate preparation for the relevant post graduate education is probably that of the civil engineer, though graduates in chemistry, biology, mechanical and chemical engineering and architecture are not necessarily excluded.

The fundamental purpose of post graduate education in sanitary engineering is to make the student 'health minded' so that he may fit into the health team. This means that the basic curriculum should comprise a general review of environmental sanitation, including its role in human society and in public health, epidemiology, chemistry, including toxicology, biology, including microbiology and parasitology, and study of animal vectors of disease. The curriculum should also provide courses in such engineering and other subjects as are suitable to the sanitary engineer's previous training and

experience and to his future needs. Field work, laboratory work, and design are essential components of the teaching programme. Research is a valuable stimulus to both teacher and student.

The symposium participants remarked that among the most serious obstacles to post graduate education in sanitary engineering is that of its cost from the standpoint of both the institution giving the instruction and the student. The importance of fellowships for such studies was emphasized and the particular role of international agencies in this regard was pointed out. WHO and other international agencies have a special responsibility, it was stated, because of the urgent need for sanitary engineering personnel in the less developed countries. International agencies should also aid in stimulating the establishment of courses for sanitary engineers in countries where the need for their education and employment has not yet been fully recognized. Still another task of international agencies is to facilitate the exchange of experience among teachers in various countries, through such means as seminars and symposia—of which this WHO symposium on the education of sanitary engineers in Europe was a good example.

MORTALITY FROM CANCER OF THE RESPIRATORY SYSTEM

A significant increase in deaths from cancer of the respiratory system—especially of the lungs, trachea and bronchial tubes—is revealed in a statistical review published in a recent number of the *Bulletin of the World Health Organization*¹. In all of the sixteen countries of Europe, America, and Oceania covered by the study, there was a steady rise from 1949 to 1952 in mortality from cancer of the respiratory system, in both men and

women. Men were affected five or six times as often as women, however.

Some of the factors suggested as possibly influencing the recorded rise in deaths from cancer of the respiratory system are:

(1) the ageing of the population and the consequent swelling of the 40-80-year age group in which cancer is most prevalent.

(2) a decrease in mortality from tuberculosis of the lungs, which may have made recognition of cancer cases easier, and

TABLE II DEATHS FROM CANCER OF THE RESPIRATORY SYSTEM AS PERCENTAGE OF TOTAL CANCER DEATHS

Country	Men		Women	
	% in 1936-38	% in 1950-52	% in 1936-38	% in 1950-52
Union of South Africa	7.9	17.2	2.3	5.3
Canada	6.2	14.8	2.5	3.6
United States	8.1	18.0	2.5	4.0
Japan		5.7		2.8
Germany Federal Republic		16.1		3.4
Austria		23.6		3.9
Denmark	4.1	13.6	1.6	3.1
Finland	12.6	25.6	2.1	5.0
France		15.9		3.8
Ireland	4.4	12.4	2.8	4.9
Italy	5.8	13.1	1.9	3.9
Norway	2.6	7.4	1.9	3.2
Netherlands	9.3	19.9	2.5	3.1
United Kingdom				
England and Wales	12.9	28.3	3.6	6.0
Scotland	10.4	26.2	3.9	6.6
Northern Ireland	7.2	16.7	3.4	4.4
Switzerland	9.1	17.0	2.0	3.0
Australia	6.5	15.5	2.4	3.6
New Zealand	7.7	16.9	2.7	3.6

Italy A serious upswing in mortality among men (45%) and a more moderate one for women (13%) has been observed the ages mainly involved being in the group 45-80 years

Finland There has been a considerable increase in mortality among both sexes above 50 years of age (30% in men)

France A 30% increase has been noted for males, but one of only 9% in females

Norway A rise of 32% has been noted among men but a relatively low death rate among women

Netherlands No rise has been recorded for women but one of 24% for men

Switzerland A 28% increase has been recorded for men, but none for women

USA There has been a 21% increase for men, compared to 10% for women

Canada A rise in recorded mortality from neoplasms of the respiratory system has been noted in males but not in females

Japan Death rates from cancer of the respiratory system are low but they have nevertheless risen by 68% among men and 83% among women

nationally assisted research in cancer and to this end WHO might promote the use of pathological and radiological atlases. Even more effective would be a system of reference laboratories holding specimens corresponding to internationally recommended definitions. A collection of suitable reference specimens might be obtained in three stages.

(1) A committee composed mainly of pathologists could be convened by WHO to indicate the items requiring classification.

(2) Small study groups from different countries might then bring their material together and agree on typical specimens.

(3) The committee could subsequently make recommendations for the selection of specimens and the reference laboratories to hold them.

Standard X ray films too might be held for reference. WHO's experience in establishing a reference system for biological standards would be of value in undertaking an activity of this kind.

In cancer as in other subjects WHO could play a part in the co-ordination of research providing a mechanism for groups of countries to investigate together problems which lend themselves to common study.

With regard to the diagnostic and therapeutic aspects of cancer WHO assistance would probably take the form chiefly of consultant advice to countries requesting it, aid in training personnel and the reference system of laboratory specimens and X ray films previously referred to.

The existing WHO services for assistance in the training of personnel and in the dissemination of technical information could meet the demands of increased activities relevant to cancer. Fellowships seminars working groups exchange of scientists assistance to educational institutions through provision of staff and refresher courses could all be used to further the ends of an enlarged programme in cancer. WHO publication and library and reference services could also be extended to meet the needs of increased interest in cancer.

In all of the Organization's activities relative to cancer liaison and co-ordination of efforts with other agencies working in this field would be important and is in fact already being maintained—with UNESCO in connexion with research on cell growth with FAO in considering the possibly carcinogenic properties of some food additives and with non governmental organizations such as the International Union against Cancer with whom the Organization might act jointly in many programmes.

The above suggestions do not represent an actual cancer programme for WHO the drawing up of such a programme would come within the responsibility of the Director General and the Organization's governing bodies. These suggestions are indicative however of a growing awareness that cancer should not be considered as a local or national problem that study of some of the fundamental aspects of the disease requires international co-ordination and co-operation.

lems of international interest and with suggestions for possible WHO action. It considered that increased international action was justified because of (1) the great expansion in cancer research since the Second World War, and the fact that only a few countries have thus far taken part in the investigations (2) the need for study of 'apparently perplexing variations in the incidence of certain types of cancer in different countries and different peoples', which suggest the possibility of associations between social, racial and environmental factors and the prevalence of certain forms of the disease, and which call for the collection of data at an international level (3) the present unavailability of statistical information from many countries and communities—information which is essential for large scale study of fundamental aspects of cancer, and (4) the growth of medical services in many countries, with a consequent demand for services to deal with cancer.

It was suggested that WHO might consult the Committee on Tumour Nomenclature of the International Union against Cancer with a view to setting up an appropriate group to deal with problems of definitions, nomenclatures and classification of different types of cancer. Eventually the recommended definitions and nomenclatures emerging from the work of such a group might be published and distributed by WHO.

The publication of statistics on cancer should continue to be part of the Organization's work in this field, and countries should continue to be encouraged to improve their medical statistical systems and hence the accuracy and completeness of the relevant returns which they submit to WHO. In addition to publishing tables of cancer statistics, the Organization should make and publish more analytical studies of the available data. Wherever possible, statistics of different degrees of reliability should be presented separately. The consultant group

pointed out that the publication of cancer statistics might also contribute to the epidemiological study of the disease, to the determination of possible correlations between cancer and racial and environmental factors, for example.

The Organization should urge countries to study any unusual cancer situations which have been observed and should assist in the arrangement of studies in groups of countries with apparently similar general conditions but apparently different cancer pictures. Assistance might take the form of sending suitable experts to such countries and of training local personnel for co-ordinated studies.

Extensive programmes in laboratory and clinical research in cancer, supported by adequate resources are in progress in a number of countries. The consultant group saw no need for WHO to enter directly into this aspect of cancer study. However it concluded that there were several useful ways in which the Organization could take part in this basically important work. It could help to train workers for countries initiating or extending local research programmes, arrange for exchanges of scientific personnel, publish results of research, act as a clearing house for information, and generally promote extension of international co-ordination in cancer research. It was suggested specifically that the Organization might put inquirers into touch with sources able to supply information on carcinogens.

An essential role for WHO would be to gather continuously, on a world wide scale data from which specific problems suitable for investigation could be identified especially problems of an epidemiological nature. The Organization could then encourage the country or countries concerned to develop the required research programmes for investigation of such problems.

The application of uniform definitions and nomenclatures would be of value in inter-

central cataloguing service by means of photocopied catalogue cards has been in operation for more than two years. The new equipment will also make possible a more rapid and economical reproduction of articles from medical literature.

Seven WHO medical library fellows including 2 fellows from Finland, 1 from Norway and 3 from Yugoslavia have spent portions of their period of study working in the WHO Library. Similar facilities have been provided to UNESCO library fellows and to student librarians from the Geneva School of Librarianship.

The *WHO Library News* which is issued monthly is distributed free of charge but only on request to 241 medical and university libraries. *Library News* consists of a list of recent accessions to the Library bibliographical notes and occasionally supplements of medical documentation interest, such as a handlist of periodicals regularly

received by the WHO Library and an annotated list of medical indexing and abstracting periodicals. Other supplements dealing with annual public health reports and review periodicals are in preparation and will be issued shortly.

At the request of UNESCO WHO has recently agreed to assume certain responsibilities formerly undertaken by the UNESCO Clearing House for Publications concerning the international exchange of medical publications. WHO will not itself collect or dispatch material but will act as a clearing house informing medical libraries in its Member States of the availability of medical books and periodicals offered for exchange or disposal by libraries. The present UNESCO mailing list of 237 institutions will be retained and contact will be made with the national exchange centres which have been established in Austria, Belgium, Denmark, Portugal and other countries.

Statistics on Epilepsy

The nature of epilepsy makes the collection of statistics on the disease difficult. In fact, although epilepsy is in itself rarely a cause of death, mortality statistics provide the only general statistical documentation of the disease. These and other difficulties are noted in the introduction to statistics on epilepsy which have recently been published in the *Epidemiological and Vital Statistics Report* (1955, Vol. 8, No. 6). These statistics include tables on deaths from and mortality rates for epilepsy in certain countries since the beginning of the century and on deaths in other countries since 1920. A breakdown by sex and age of the data on deaths and mortality rates in selected countries is also given.

WHO LIBRARY SERVICES

The WHO Library, which includes the library of the former Office International d'Hygiène Publique contains over 30 000 volumes and a large collection of reprints, official documents and government reports. For documentation on disciplines allied to public health (i.e., social and economic sciences, industrial problems, etc.), there are available in Geneva the very large collections of the UN Library (400 000 volumes, including the medical and public health sections of the former League of Nations Library) and the International Labour Organisation (350 000 volumes, including a large section on occupational hygiene and safety).

In 1954 the WHO Library received regularly 1631 medical and scientific periodicals, 81 statistical bulletins, and 25 official gazettes. In addition 1454 annual reports were received from health administrations and institutions, government departments and other sources. A special feature is a comprehensive international collection of medico-bibliographical tools (indexing and abstracting periodicals, library catalogues, national bibliographies, publishers' catalogues, hand lists and union lists of periodicals, etc.) essential in answering inquiries for medical documentation.

The Library is serviced by a staff of 18, representing 8 different nationalities and able to work effectively in 14 languages.

During 1954 and the first half of 1955, information was supplied to inquirers from the WHO regional offices and from the following countries: Argentina, Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, France, French Equatorial Africa, Germany, India, Italy, Morocco (French Zone), the Netherlands, Norway, the Philippines, Poland, Portugal, Southern Rhodesia, Sweden, Turkey, the United Kingdom, the USA and Yugoslavia.

More than a thousand periodicals are regularly scrutinized and articles of interest to WHO indexed by subject and by country. Annual comprehensive bibliographies on the quarantinable diseases (cholera, plague, relapsing fever, smallpox, typhus, yellow fever) are prepared and published regularly in the *Bulletin of the World Health Organization*. Other bibliographies are published from time to time in the *Bulletin* (e.g., on toxicology of pesticides and on influenza) or are issued as WHO mimeographed documents (e.g., a bibliography on rural hygiene), others (100 during 1954 and the first half of 1955) are prepared in response to requests from WHO technical staff and from national health departments and institutions and a limited number of copies of such bibliographies are usually available on request.

Close contact is maintained with other medical and scientific libraries throughout the world and the WHO Library participates in the international network of inter-library loans through the service operated by the Bibliothèque Nationale Suisse in Bern. During 1954 more than 900 items were lent to Swiss university medical, and scientific libraries. In addition microfilms or photocopies of material not available nationally were supplied to WHO regional offices and to libraries in Aden, Argentina, Cambodia, Czechoslovakia, Fiji, Finland, France, Germany, India, Iran, Israel, Italy, Japan, Kenya, Liberia, New Guinea, Norway, the Philippines, Poland, the Seychelles, Union of South Africa, Sweden, Taiwan, the United Kingdom, the USA and Yugoslavia.

As the result of a recent installation by WHO of modern photocopying equipment the WHO Library will shortly be supplying photocopied slips of all articles indexed to WHO regional offices requesting them. A

discussions and visits to several health and medical institutions in Washington D C Baltimore and New York " took place from 30 May to 4 June

According to the programme on the first day the conference participants met at the National Institutes of Health Bethesda Md There were two seminar discussions the first of which Dr H L Dunn was Chairman was on techniques of gathering processing and using reliable health and population statistics and on statistical control in research work the second of which Dr J W Cronin was Chairman had as subject the designing equipping and managing of hospitals and clinics

The second day began with two meetings at Bethesda Dr W W Wright was Chairman of a discussion on newer knowledge in virus and parasite diseases This was followed by a seminar under the chairmanship of Dr J M Andrews on new developments in insecticides and their use in area programmes In the afternoon the conference participants visited the Johns Hopkins School of Hygiene and Public Health in Baltimore Md Here there were round table discussions on various subjects including (1) graduate training in public health (2) new ideas in public health administration and (3) housing in relation to health

The third day included travel from Baltimore to New York and an opportunity for the participants to tour the United Nations Headquarters

The following day was devoted to discussion of a number of important public health problems (1) the epidemiology and prevention of poliomyelitis with Drs T M Rivers, H E. Van Riper and Johannes Frandsen and Professors Thomas Francis jr and

J E. Salk among the participants (2) techniques of official public health administration and voluntary agencies (3) basic principles relating to efficient development and large scale production of antibiotics vaccines and other pharmaceuticals and (4) procedures in setting standards of safety potency and dosage of pharmaceuticals—problems faced in developing national pharmacopoeias—with Sir Arcot L. Mudalir and Drs L. C. Miller F. J. Brady F. O. Taylor and E. Fullerton Cook participating

The fifth day of the conference gave participants a chance to visit various hospital centres in New York and to choose among several seminars The topics of the day included tuberculosis control teaching public health to undergraduate medical students the management of banks for blood cornea and aorta the control of world wide influenza epidemics nutrition relations among insect borne viruses the yellow fever threat, and rabies control these three subjects being discussed by Drs G. K. Strode Hilary Koprowski F. L. Soper and Max Theiler and mental health programmes, with Drs F. Fremont Smith H. Brill J. R. Rees and G. S. Stevenson and Professors S. Z. Levine and P. V. Lemkau as participants

On the final day a seminar on the control of cancer was held at the Memorial Center for Cancer and Allied Diseases The last discussion was on developments in physical medicine and rehabilitation services and took place at the Institute of Physical Medicine and Rehabilitation of the New York University Bellevue Medical Center

This international health conference enjoyed the participation and assistance of a wide variety of organizations and companies

Notes and News

Nursing Education Seminar

A second WHO sponsored seminar on nursing education in the Western Pacific Region was held at the invitation of the Government of Fiji, in Suva, Fiji from 4 through 28 July 1955. This seminar was a natural follow up to a similar one held in Taiwan in November 1952.¹ It was attended by consultants on general education and social anthropology as well as by personnel directly concerned with the education of nurses and the administration of nursing services. There were participants from Australia, Brunei, Cambodia, China, Federation of Malaya, Fiji, Guam, Hong Kong, Japan, Korea, Netherlands, New Guinea, New Zealand, the Philippines, Sarawak, Singapore, Territory of Papua and New Guinea, Tonga, Trust Territory of the Pacific Islands, Viet Nam, and Western Samoa.

Among the topics discussed at the seminar were: (1) the basic education of nurses with particular reference to clinical nursing practice; (2) the relation of hospital and nursing service administration to educational programmes for nurses; (3) the preparation of nurse educators and other post graduate programmes and the relation of such programmes to the requirements of the health services of a country; and (4) the preparation of auxiliary nurses and midwives.

Co-ordination Office for Malaria Eradication Programme

The Pan American Sanitary Bureau which is also WHO Regional Office for the Americas has established in Mexico City a special office for providing technical advice and co-ordination for the malaria eradication programme which is being undertaken in the

Western Hemisphere. This office will develop technical standards for antimalaria campaigns, give advice to governments on the planning operation, and evaluation of eradication projects and on technical procedures for assuring the successful completion of such projects, develop a system for reporting and evaluating results and assist in the training of personnel.

The chief of the office is Dr C. Alvarado, Regional Malaria Adviser, who will be assisted by an entomologist, an epidemiologist and a sanitarian.

Meat Hygiene Seminar in Alexandria

A seminar on meat hygiene was held under the auspices of the WHO Regional Office for the Eastern Mediterranean from 4 to 23 July 1955 in Alexandria. Lectures were given at the University of Alexandria and practical laboratory demonstrations took place at the municipal slaughterhouse.

Participants in the seminar came from Ethiopia, Iran, Iraq, Jordan, Saudi Arabia, the Sudan, and Syria, as well as from the host country, Egypt. Two special WHO consultants led the work of the seminar: Dr Aage Jepsen of the Royal Veterinary and Agricultural College of Copenhagen, Denmark, and Dr V. E. Albertsen, Veterinary Inspector, Meat Hygiene Department of the State Veterinary Service, Copenhagen.

International Conference on Public Health

Following the Eighth World Health Assembly, an international conference on public health was held under the auspices of the U.S. National Citizens Committee for the World Health Organization, Inc. in honour of the delegations to the Assembly. This conference described as "a series of seminar

¹ See *Chron. Wld Hlth Org.* 1953 2: 14

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Yaws is a disease widespread throughout the tropical regions. It is usually contracted in childhood and lasts a life time. If untreated the sores spread and in time the disease eats away flesh, attacks bones, disfigures, and deforms.

The above is from the first World Health Organization picture set (WHO Picture Set 1) produced to meet an increasing demand for a light, inexpensive exhibit on the aims and work of WHO.

The picture set is entitled *Health Is a Fundamental Human Right* and deals in 16 separate panels, with some aspects of WHO's work. The subjects include nutrition, poliomyelitis, maternal and child health, midwifery training, public health nursing, school health services, endemic syphilis, anti-yaws campaigns, malaria control, bilharziasis control, water sanitation, and the care of premature infants. The panels are 14 in. by 20 in. (35 cm by 50 cm) in size, offset printed on heavy poster paper, and suitable for tacking or fixing on walls or bulletin boards for display.

The set is available with English, French, Spanish, German, or Arabic text; there is also a limited number in Danish and Norwegian. It may be obtained on request from the public information officers of the WHO Regional Offices.



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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Reprinted from the

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Volume 6, No 6

This study is a comparative survey of the methods of hospitalizing the mentally ill in more than thirty countries. The principal chapters deal with the hospitalization of mental patients, the care of certain special categories (mental defectives, alcoholics, epileptics, etc.), safeguards against arbitrary detention, and trends in current legislation. Six tables furnishing a synopsis of the main admission procedures are appended.

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MENTAL HEALTH THROUGH PUBLIC HEALTH PRACTICE

The extent of serious mental disease in economically well developed countries and the problems it creates have been a cause of concern for many years. In most countries of Europe the number of mental hospital beds ranges from one to four per thousand of the population. Until a few decades ago many of the patients occupying these beds remained chronically ill and in need of care for the whole of their life. Of those who did recover many subsequently relapsed and required further hospitalization.

New methods of physical treatment—insulin therapy, electro-convulsive therapy and the use of drugs such as chlorpromazine—have led to a more optimistic outlook in the therapeutic field and to the possibility of permanent cure for many patients whose prognosis formerly offered no hope. In many cases the improvement brought about can render patients accessible to psychotherapy which when followed by social casework can produce lasting remissions.

Growing evidence of the influence psychological factors can exercise on these patients has drawn attention to the role of unfavourable psychological states and emotional influences in the etiology of their disorders. An individual for instance whose personality development has been weakened in childhood may fall into a state of permanent ill health when faced with some unaccustomed stress. There is clinical evidence that a large number of neurotic breakdowns take place in response to stresses which would in healthy people create no more than a temporary disturbance. Interest has thus been aroused in the possibility of preventive measures to mitigate stress situations that may impinge upon basically weak personalities. There seems no doubt also that many cases

of schizophrenia and melancholia can be prevented by mental hygiene methods particularly through the prompt handling of emotional disorders brought about by immediate environmental stresses. Although it may not be possible to predict the point at which a particular individual will break down there seems little doubt statistically that the number of serious disorders can be reduced through preventive measures.

In European communities many patients have somatic symptoms without signs of ideational disorder. Such patients can often be shown to be suffering from a prolonged emotional state which either causes or contributes to what is essentially a neurotic condition. The etiological factors can frequently be traced to unfavourable attitudes developed in early childhood within the family.

The numbers concerned are so vast however that a wholesale attack on the problem would require an expenditure of time and money which could not readily be made available. Furthermore a comprehensive project of this nature might be premature at the moment since our etiological knowledge particularly of the earliest phases of development of unfavourable emotional attitudes is not yet precise enough to indicate exact lines of attack. We can nevertheless hope to mitigate certain forms of ill health and reduce their incidence through the protection of persons at periods of stress and we can through existing medical services make earlier treatment available.

In 1950 the WHO Expert Committee on Mental Health discussed how concepts and hypotheses derived from clinical experience in psychiatry could be applied through

SCHEDULE OF MEETINGS

- 5-8 September Regional Committee for Europe, fifth session, Vienna
- 5-10 September Regional Committee for South East Asia eighth session Bandung
- 6-8 September PASO Executive Committee twenty sixth meeting Washington D.C.
- 7-14 September Expert Committee on Trachoma second session, Geneva
- 9-21 September PASO Directing Council eighth meeting WHO Regional Committee for the Americas, seventh session Washington D.C.
- 13-19 September Regional Committee for the Western Pacific sixth session Singapore
- 19-24 September WHO/FAO Joint Conference on Food Additives Geneva
- 19-24 September Regional Committee for Africa fifth session Tananarive Madagascar
- 21 September PASO Executive Committee, twenty seventh meeting Washington, D.C.
- 27-30 September Regional Committee for the Eastern Mediterranean, Subcommittee A Beirut
- 4-11 October Expert Committee on Insecticides sixth session Geneva
- 6-12 October Study Group on Epilepsy London
- 10-15 October Expert Committee on Biological Standardization ninth session Geneva
- 13 October FAO/WHO Seminar on Nutrition Education and Health Education
3 November Baguio Philippines
- 17-22 October Study Group on Rehabilitation of the Deaf and Partially Deaf Child Geneva
- 24-29 October Expert Committee on Professional and Technical Education, third session Geneva
- 24-29 October Expert Committee on Drugs Liable to Produce Addiction sixth session Geneva

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Six case histories from an investigation conducted in the Netherlands by Professor A. Querido and his assistants and presented to the study group were in some degree illustrative of the background to its deliberations. In his introductory talk Professor Querido referred to these cases to throw into relief some of the problems with which participants were faced. For this reason and because it will lend point to the brief summary of the discussions that follows parts of Professor Querido's statement are here reproduced.

It was said at the Amsterdam seminar that organization and mechanization are among the chief characteristics of our civilization today. Modern medical practice must necessarily reflect these features and, because medicine is unthinkable without the personal tie between physician and patient they imply a threat to the basis of medical activity. While we admit that the organization of medical practice is necessary simply because we want to bring medicine to the largest number of people we are firmly convinced that the personal tie is essential and must be perfected if it may be that the solution to this dilemma will be found to lie in the integration of mental health principles into medical and, especially public health practice.

What does it really mean to consider the patient as a person and not as a figure in our administrative organization?

An investigation into the condition of patients discharged from hospital surgical wards, more or less along the lines of research carried out in Glasgow by Ferguson and MacPhail,² revealed to our astonishment that 3-6 months later about half of them still had exactly the same complaints. On investigating these cases more fully we discovered that they were suffering from a variety of disorders which appeared to have been completely disregarded in the hospital. This led to certain questions. What does the hospital doctor know about the patient he has to treat? How much is the patient regarded as a person and not as a narrow somatic problem that can be solved by technical means? And further if in the first place, we were to consider the problems of the patient as a whole, might we not change our therapy? Would this not change that terrible result of some fifty per cent. lack of success? A study of the case histories gave some inkling of what happens to the man or

woman who gets into the medical machine and of the extent to which that machine may strip the person of his personality. Most of them told a tale of missed opportunities.

The first step in the investigation was taken during the patient's stay in hospital, but might equally have applied to an out-patient department or a practitioner's surgery. The choice of subject was completely at random: a name was picked from the telephone directory and the patient whose name corresponded most closely to it alphabetically was taken. The only further consideration was that he must not be above a certain age, be dying or in great pain.

A doctor interested in psychology but not a psychiatrist, was then asked to contact the patient in hospital and in a social worker went simultaneously to the patient's home so that there could be no communication between the patient and his family as to what was said to either investigator. After this first contact the social worker and the doctor compared notes and, if necessary obtained further data to correct discrepancies or omissions. These with the medical history were then handed to me for integration into a composite picture. The cases were then submitted to the clinical staff who had been concerned with the particular patients and the question was put: Do you think that your therapy would remain the same had you had all these facts at your disposal? In many cases the clinician admitted that he would have acted differently if he had known the full personal history. In fact, in certain instances it was actually possible to change the therapy. As a matter of interest, the time required to compile this type of case history was from five to seven hours. The scantiness of the "hospital data" on which action was originally taken was in itself striking.

The cases, typical of thousands and tens of thousands showed, I think, that there is something lacking in our medical provisions not only in the hospital, but in our medical care in general. However before we start planning large and perhaps revolutionary programmes of education for doctor, nurse and social worker before we call for new types of specialist, let us first try to find out exactly what is lacking and what is needed to make medical practice in its widest sense more effective, more fruitful and more humane. If it is true that the essence of mental health principles implies full interest in, and respect for the human being as such the question arises: By whom, by what means and at what points can this interest be integrated into the technical practice of medical care and medical organization? Without its integration a large part of our efforts will be vain and wasted, and a large part of human suffering, which might have been diminished, will remain unrelieved.

Ferguson, T. & MacPhail, A.N. (1954) *Hospital and community*. London.

existing public health practices¹. In this connexion, there are three essential requirements for the practice of public mental health work

(1) knowledge of the various emotional stresses and of the needs to which they give rise at various critical periods in a person's life

(2) development of the general theoretical principles of mental hygiene to be utilized at these points

(3) establishment of methods by which public health practices may be organized to apply these principles

The Committee considered fully the needs arising during pregnancy and childbirth, those of the infant the pre school child and the schoolchild the special needs of the handicapped child the individual's emotional problems on contracting a communicable disease and the needs of old people and the chronically sick. The Committee also indicated certain ways in which mental hygiene theory derived from clinical psychiatry might be applicable and broached the difficult practical problem of mental hygiene training for public health workers.

In 1953 the WHO Regional Office for Europe sponsored a seminar at Amsterdam with representatives from 15 European countries to explore more closely the problems of different countries in this field and to examine the practical difficulties inherent in the implementation of mental hygiene principles through the public health services. In this connexion the seminar took up the problem of training and reorientation of public health personnel—doctors nurses social workers and others—and attempted to delineate their relationship with specialist psychiatric organizations.

Although the Expert Committee on Mental Health and the Amsterdam seminar described

the more important common stresses and mental health requirements indicate areas of psychiatric theory and practice upon which public health services might draw no detailed statement was made as to how mental health principles should be applied in public health practice. Indeed no clear picture had as yet emerged of the areas in which a public health worker could be effective nor of the methods and extent of training he would require. The Regional Office for Europe as a next step, therefore called a special study group which met in Monaco in April 1955 to examine these practical problems. The number of participants was limited to 20 of whom 14 were practising public health officers 4 nurses or social workers and 2 psychiatrists already engaged in the teaching of mental hygiene principles to public health personnel.

It was realized at the outset that a group of this nature could make no specific recommendations since any changes proposed would have to be intimately related to the public health services of each country. It was nevertheless possible that certain general principles which could be applied in different countries might emerge from this further study.

The group met for 12 days and was assisted by one expert in social medicine and another in preventive psychiatry. The role of these two experts was to introduce the problems involved and to act as consultants to the study group.

Most of the discussions took place in two working parties in each of which the different disciplines were represented. A discussion leader was provided for both groups to facilitate their work and at the close of the seminar each reported back on its deliberations to a plenary meeting.

A study of the patient

The problems of organizing public health work cannot be considered in the abstract

¹ *World Health Org. techn. Rep. Ser.* 1951 31

assume abnormal dimensions going beyond the normal fluctuation

Contacts made in the course of normal public health work may be used for history taking and diagnosis and consequently for the early treatment and prevention, where necessary of neurotic and socio-psychological disorders many of which might tend to be accentuated by a complex of social and somatic factors. A further advantage of starting mental hygiene work at this point is that public health personnel already have a preventive orientation.

The group therefore unanimously stressed the need to promote a mental health outlook among medical and public health workers at all levels.

Team work

The study group felt that team work should be a guiding principle in the organization of public mental health practice and that hierarchical methods should be avoided.

In Finland the problem of mental health has been tackled on this basis. The team in the field consists of a community doctor (corresponding to the general practitioner in most countries), the local nurse and a midwife. Behind them is a consultant team composed of a psychiatrist, a paediatrician and a social worker. The fact that the general medical practitioner is in the forefront strengthens the work of the team as does the avoidance of interference with the nurse's and the doctor's relationships with the patient. So far as the latter is concerned he is conscious only of the people he knows—doctor, nurse or local midwife. These teams have all been working on the basis of anticipatory guidance with a view to preventing the onset of mental disturbance in later years and of correcting bad influences. Teams which are similar in some respects have been initiated in Canada, the United Kingdom and the United States.

Role of the hospital

There is no doubt that much avoidable hospitalization takes place and that this measure is often resorted to as an easy solution to problems that could be solved more satisfactorily by preventive mental health work. At the same time the hospital can play an important role both in preventive and in therapeutic mental health if a spirit of team work prevails both among the staff and externally with the appropriate mental health workers, specialists, social workers and occupational therapists. In many instances this would require a new approach to hospital organization, the establishment of better links between the hospital and the local community, improvement of staff working conditions and a reappraisal of the value of visiting.

Mental health aspects of public health practice

The vast extent of the need for public mental health work, the experimental nature of much of our knowledge in this field, a certain diffidence on the part of the public and the medical profession towards psychiatry and the prohibitive cost that would be involved place the creation of any specialized organization to undertake a wholesale attack on the problem out of the question. The study group was therefore of the opinion that it is the public health services themselves that should acquire a fresh orientation and not that some new organization should be added to them. Whether in hospital in the out-patient department, or in general public health work, the mental health team should be composed of workers with whom the man in the street is familiar and the doctor, in particular the general practitioner, should take the lead while the specialists should stand by ready to give their educational and technical assistance wherever necessary.

Present status of public mental health work

Members of the study group felt that among all the widely divergent forms of public health organization in their respective countries, few gave due weight to psychological and social work, either in prevention or treatment. In the majority of cases medical contacts are not based upon a comprehensive knowledge of the human being. There exists further, a widespread suspicion among medical practitioners and the public at large of mental health disciplines and methods.

This limited approach has serious psychological consequences not only because it leads to a lack of co ordination among the different medical and social services and to duplication of visits but also because action in the medical field may be one sided and taken under inadequate conditions. Unity and continuity of contact should be established in medico social work.

This unity of action should also embrace the social security services. The development of modern social security systems has in many cases had a far reaching effect on the attitude of the patient to his illness and on the attitude of the doctor to the patient. An aspect of this may be seen in the mechanical accordance of facilities which may encourage patients prone to regard their illness as a right to abuse medical attention and prescriptions. In order to utilize social insurance resources to the best purpose it is important not only that the patient be stimulated to an active interest in his recovery but also that social insurance institutions be better informed of the importance of mental health questions and that their support be made available to meet preventive needs.

Mental hygiene requirements

The need for mental hygiene falls into two main categories, that of preventive work among the general public and that of treat-

ment in cases of mental sickness. In the latter a further division may be made of cases arising from psychological and social problems that remain within the limits of normal fluctuation and cases which reach abnormal dimensions. In all these fields mental health patients have the right to the same standards of care as are received by the physically ill.

Special groups of persons have their own needs in the field of mental health among them the aged and the sick, a number of biological occurrences and periods of life require special medical attention. Provisions to meet these requirements have been evolved in most countries for instance in ante natal care, at childbirth, and in child welfare clinics. This is also true in the case of certain common diseases and in some countries national health provisions extend to the care and treatment of the sick.

Since the biologically sensitive or crucial periods in life are also sensitive or crucial from a mental health standpoint it is logical that mental health principles should be incorporated into all the above provisions. This means that wherever it is deemed to be necessary to reinforce the health of the public by special measures not only a somatic problem but also psychological and socio psychological problems must be met. Furthermore, all sickness can be regarded as a biological crisis and therefore implies the possibility of psychological or social involvement.

The organization of public mental health work

Those who in the course of their work have to deal with these biological phases and crises must therefore also be able to deal with mental health problems. This implies the important principle that public mental health work is not the specialist's job. The specialist is called on to deal with problems that

assume abnormal dimensions going beyond the normal fluctuation

Contacts made in the course of normal public health work may be used for history taking and diagnosis and consequently for the early treatment and prevention where necessary of neurotic and socio-psychological disorders many of which might tend to be accentuated by a complex of social and somatic factors. A further advantage of starting mental hygiene work at this point is that public health personnel already have a preventive orientation.

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In the Netherlands and in the USA there are social psychiatrists who are trained to do preventive work on a group basis with the aim of reaching out to the whole community. There is a case for undertaking the training of such psychiatrists to work in conjunction with medical officers of health and to act as advisers and liaison officers in mental health matters. The teams thus organized, with expert resources on call behind them as part of a larger team, could function experimentally to begin with, within the framework of existing public health organizations.

Education and training

If an appreciation of mental health work is to be acquired at all levels a start must be made to impart a proper knowledge of mental health principles in the universities and in professional training courses. While the key to the situation must lie in the training of the future physician all members of the public health services—nurses, midwives, social workers and administrative workers—should receive some basic education in mental health in the course of their training. The medical officer of health has much to learn in the field of mental health and the psychiatrist, if he is to work in the field of public health, should study epidemiology, sociology and administration. Teachers in particular, should be taught mental health principles and be chosen for their ability to apply them.

The crux of the problem in faculties and training schools lies in the provision of suitable curricula and a teaching staff with the right outlook. There was criticism of the fact that the public health services in most countries had little real say in the planning of teaching curricula whether in medical faculties or in institutes of education.

At the same time the specialist in abnormal psychology is not the person who is generally speaking best qualified to teach preventive mental health principles. The ability to grasp

the implications beyond the purely technical problem is not obtained by specific knowledge and psychopathology as such but by an understanding of normal psychological development, by the ways in which human relationships develop and in which they are expressed and realized in normal society. The work of the psychiatrist may have a most important educational influence, it is true. The methods used to deal with the abnormal can be used to demonstrate how normal tensions and situations can be handled. Nevertheless, the psychiatrist's role should remain that of a consultant.

Given the present limitations in our experience and knowledge of preventive mental health work, much of the necessary educational work in faculties and institutes, as well as among personnel already working in the field, must be led by suitable persons from among those who are seeking to learn through practice. The most suitable method would seem to be through meetings of teams or groups of different professions working in the field in order to examine and discuss specific examples and cases employing the principles of group dynamics. In this way the group could be prepared for the development of a qualified teaching personnel among doctors, nurses, social workers and other professions concerned that would eventually assist in implementing suitably modified curricula in existing institutions. Meanwhile the medical student might usefully be introduced to the subject through association with field work. This could in part be related to the treatment of patients in the training hospitals.

Public education in mental health principles demands, in general, a more extensive preparation and distribution of literature on the subject.

The most important need to be met in this field is that of co-ordinated work to promote the education of future parents and young parents through voluntary associations linked with public health services and social

welfare organizations. For this type of education methods and materials should be put at the disposal of medical and other educators. No discussion of such matters can carry the necessary weight and conviction unless it is founded on a firm scientific basis.

Preliminary material of this type might be compiled on certain well-established and accepted concepts such as the problems of pregnancy, the separation of mother and child, the consequences of hospitalization and school age problems.

TECHNICAL ASPECTS OF MALARIA CONTROL

Second Asian Malaria Conference

The action of the Eighth World Health Assembly in recommending a world wide programme of malaria eradication and establishing a special fund to aid in financing this gigantic effort¹ served to focus attention again on what has become one of the most urgent of international health problems. The Assembly's move was the most recent in a series of steps directed towards a change of strategy in malaria control. Other important steps were the First Asian Malaria Conference (Bangkok, September 1953)² at which the status of malaria control in Asia was reviewed and specific recommendations made for the organization of long term control programmes; the WHO symposium on the control of insect vectors of disease (Rome, October 1953)³ at which the principal subject of discussion was the development of insect resistance to insecticides; the XIV Pan American Sanitary Conference (Santiago, October 1954)⁴ at which it was decided that malaria-control efforts should be intensified and co-ordinated in the Americas in an attempt to eradicate the disease from the Western hemisphere; and the Second Asian Malaria Conference (Baguio, the Philippines, November 1954) at which the technical aspects of malaria control particularly in

the South East Asia and Western Pacific Regions were considered.

It is with this last conference—the Second Asian Malaria Conference—that the present article is concerned. What follows is drawn from a report on the Conference which was approved by the 42 participants who came from 13 different countries or territories or who represented certain governmental or inter governmental agencies.

Vector problems

The malaria vector species in the Western Pacific and South East Asia Regions pose some problems of special interest. For example, it was generally thought before 1952 that the chief vector in the Philippines, *A. minimus flavirostris*, did not often rest indoors during the day and even showed some tendency to avoid DDT treated surfaces which would make residual spraying an ineffective means of control; however, a WHO-assisted pilot project in Mindoro has shown that DDT residual spraying of houses will interrupt transmission of malaria by this mosquito. Similarly the *A. leucosphyrus leucosphyrus* group in Sarawak was considered to be not amenable to control by residual insecticides but the results of a recent pilot study have suggested that this measure might be effective although the data are not yet sufficient to draw definite conclusions.

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The chief vectors in New Guinea—*A. punctulatus*, *A. farauti*, and *A. koliensis*—have also been studied with a view to their control, and preliminary results of experiments have given promise of the efficacy of residual insecticides.

DDT residual spraying has proved very effective against *A. minimus minimus* in a number of countries: Burma, China (Taiwan), and Thailand. However, it has been observed in the Pays Montagnards du Sud of Viet Nam that DDT residual spraying of houses alone did not bring about a significant reduction in the malarionetric indices until after two or three years successive spraying. "Selective spraying has given good results against *A. minimus minimus* in Burma, Taiwan, and Thailand.

In Malaya spraying with DDT and BHC reduced, but did not by any means stop transmission of malaria carried by *A. maculatus*. It is considered that suppressive drugs are a more effective control method where a rapid effect is required.

A. sudaicus has been effectively controlled by DDT residual spraying in some parts of India and in Indonesia, where it is the principal vector. But in certain areas in Indonesia development of resistance to DDT has been noted. Thus far, this is the only case of anopheline resistance reported in the South East Asia and Western Pacific Regions. In two of the areas in question DDT was used as a larvicide between the years 1947 and 1950 which might account for the development of physiological resistance to this insecticide; in another area however, probable behaviouristic changes have been observed.

Research

The Conference participants reviewed the malaria research which has been conducted in the South East Asia and Western Pacific Regions and called attention to points on which study is needed.

With regard to entomological investigations the need for investigating the problems of colonization of vector species to facilitate basic biological studies was pointed out.

It was suggested that with their thousands of islands and highly endemic malaria the South East Asia and Western Pacific Regions offer particularly rich opportunities for the emergence of malaria parasites with inheritable peculiarities of behaviour and that observations by research institutions or field workers might help to fill significant gaps in present knowledge of this subject. Among the inheritable variations in the parasites is, for example, that which leads to resistance to proguanil and pyrimethamine. Resistance to both these drugs is known in a few small foci but the extent of resistance and the distribution of resisting strains throughout the two regions are little known. Even less known are the variations which involve the form of the parasites. Geographical varieties with a distinctive morphology have been described from several parts of the world but the range and distribution of variation in the parasites of the regions are still to be defined and offer an interesting field for inquiry.

In therapeutics too there is need for much research. In the South East Asia and Western Pacific Regions, as elsewhere the radical cure of vivax malaria by some simple safe and speedy means remains an unsolved problem—and one which will become even more insistent when spraying programmes have arrested mosquito transmission and residual infections come into greater prominence. The most useful drug seems to be primaquine which at a dosage of 15 mg base daily for 14 days terminates the infections caused by certain vivax strains. However the sensitivity to primaquine of *P. vivax* in the two regions is not well defined except with regard to one strain from New Guinea and other strains from Korea the dosage and period of treatment necessary for radical

cure remain uncertain and further treatment studies are desirable

Pyrimethamine has been shown to offer encouraging possibilities of suppressive cure at an early stage of vivax infection. Given at a dosage of 25 mg once a week from the start of infection and continued for at least two months the drug apparently terminates a proportion of vivax infections due to particular strains. Pyrimethamine for this purpose should be the subject of investigations in the South East Asia and Western Pacific Regions.

Throughout the two regions the treatment of falciparum infections with single doses of chloroquine or amodiaquine is an accepted and valuable therapeutic measure. However more information on the sensitivity to these drugs of the prevailing falciparum strains is necessary before it can be assumed that the final cure rate is high.

Continued research is required on control by spraying with insecticides: quality of insecticides, formulations, dosages and methods of application need to be studied so as to lower the costs of control. Particular subjects for investigation are methods of determining the amounts of chlorinated hydrocarbons remaining on surfaces of varying composition, methods of measuring the degree of sorption and the losses of insecticides in the course of residual spraying and ways of reducing these losses and methods of ensuring the application of the desired amount of insecticide per square metre on surfaces of materials from which the liquid tends to run off before a full dose is reached.

There is need also for limited studies of certain naturalistic methods of malaria control such as the clearing of vegetation in some areas where *A. leucosphyrus* is the vector and the selective use of automatic siphons in certain *A. minimus flavirostris* streams.

Attention was called to the desirability of investigating the "New Guinea type of endemicity". In some parts of New Guinea

parasite and spleen rates in infants and children indicate a very high level of malaria transmission throughout the year, the spleen rate in children being constantly over 80%. Although the parasite rate tends to decline at an early age, the spleen rate of adults remains above 70%. It was suggested that this endemicity be studied by (1) assessing the transmission rate on the basis of the infective density of the vector and the curve of parasite density in infants and children, and (2) obtaining further data on the development of immunity to the local strains.

Role of drugs

Considerable discussion was devoted at the Conference to the role of drugs in relation to spraying programmes and in special situations.

The theoretical possibilities in the use of drugs are good but practical difficulties impose limitations. Mass suppressive treatment is impractical and radical cure is difficult except in falciparum infections.

It was agreed that there are three possible and practical courses of action if there is evidence of clinically active malaria at the beginning of a spraying programme.

(1) The use of drugs during spraying operations only for persons with fever at the time: a single dose of chloroquine or amodiaquine being appropriate. Most falciparum infections would be terminated and all infections so treated would be clinically relieved.

(2) The administration of single doses of chloroquine or amodiaquine to all persons at the time of spraying, a course for which the occurrence of many cases of fever would be a clear indication.

(3) The administration of single-dose treatments repeated at short intervals for a few weeks. Useful drugs for this purpose are chloroquine, amodiaquine and pyrimethamine.

Towards the end of spraying programmes, when transmission has been interrupted for a significant period, residual vivax and malariae infections are likely to present a problem for which there is no simple answer, and in many areas with poor dispensary facilities there may be no alternative but to allow the infections to burn themselves out. The most useful drug is primaquine given daily for 14 days at a dosage of 15 mg base. After the interruption of the spraying programme cases of malaria should be dealt with promptly. It was suggested that a single dose of 600 mg of chloroquine base with 15 mg of primaquine base, given together, would eliminate the immediate dangers to the community.

It was emphasized that epidemics occurring in areas as yet unsprayed demand quick action, and that drugs can best meet the immediate situation. One of the most effective patterns of drug administration is perhaps that of an immediate single dose of 600 mg chloroquine or amodiaquine base with a weekly follow up of chloroquine, amodiaquine, mepacrine, or pyrimethamine at appropriate dosages and continued as appears necessary. Spraying with insecticides should, of course, also be undertaken at once.

A special situation arises when land is opened up for settlement and drug suppression may be the answer to the problem during the period of main risk if it has not been possible to provide houses which have been sprayed beforehand with residual insecticides. Another special situation is that which occurs when populations are settled for only part of the year. Here too drugs (administered in single doses upon the return home of these populations) may have to supplement spraying.

Attention was drawn to the position of countries which hold large stocks of quinine or mepacrine and are therefore reluctant to buy the newer drugs. The use of quinine imposes an extra burden of administrative

difficulties on a national malaria-control organization, but, efficiently used in times of need the drug can usefully supplement residual spraying programmes. Though less effective than chloroquine or amodiaquine mepacrine may replace these drugs at the same dosage when the newer drugs are not readily available.

National malaria-control programmes

Documentation on national malaria-control programmes was provided in answer to a WHO questionnaire by many countries and territories, representing an aggregate population of 659 million of which 276 million live in malarious areas. In 1953, 80 million—i.e. 29%—were protected.

Table I summarizes the pertinent data of the programmes on which reports were received.

As at the First Asian Malaria Conference participants discussed the cost of malaria compared with the cost of controlling the disease and as before concluded that control was a sound national investment. Further information on the actual social and economic benefits of malaria control and on the cost of spraying operations is needed and efforts should be made on the part of governments to obtain such information. Attention should also be given to ways of cutting costs. Standardization of procedures, supplies and equipment and the local manufacture of DDT and of spraying equipment in some countries were suggested as possible economy measures.

The Conference participants considered an outline of probable needs for personnel and training for malaria-control programmes in the South East Asia and Western Pacific countries. This outline and the discussion concerning personnel requirements for malaria control schemes pointed out the necessity of increasing the existing facilities and initiating new training centres to serve the two regions.

TABLE I STATUS OF MALARIA CONTROL IN CERTAIN COUNTRIES AND TERRITORIES IN 1953

Countries or Territories	Total population	Population in malarious regions	Population effectively protected	Population still to be protected	International or bilateral assistance	Cost per person protected (US \$)
Afghanistan	12 000 000	1 500 000	949 000	551 000	—	0.12
Brunei	55 000	36 000	40 000	4 000	—	0.33
Burma	17 000 000	7 400 000	13-5 722	6 462 000	UNICEF WHO	Not more than 0.21
Cambodia	4 000 000	400 000	70 000	330 000	WHO FOA ^b	0.12
Ceylon	8 969 000	3 000 000	3 000 000	—	—	0.20
China (Taiwan)	8 463 350	5 555 000	1 526 306	4 028 694 ^d	WHO FOA	0.17
Hong Kong	2 500 000	2 400 000	2 300 000	200 000	—	0.04
India	461 622 955 ^f	200 000 000	63 000 000	137 000 000	FOA	0.09
Indonesia	70-80 million	30 000 000	2 798 130	27 201 870	AHO FOA	0.16
Japan	67 000 000	516 642	337 400	129 242	—	0.06
Laos	2 602 300	650 579	279 266	371 313	—	—
Nepal	9 000 000	5 100 000	5 000	5 095 000	WHO FOA	0.13
New Hebrides	43 914	43 000	6 000	42 000	—	—
Northern Borneo	1 115 million	23 population	10 000	—	—	—
North Borneo	334 141	290 000	—	290 000	—	0.40
Papua and New Guinea	1 616 400	—	24 000 11 000 ^e	—	—	—
Philippines	21 400 000	6 000 000	1 000 412	4 999 588	WHO FOA	0.215
Portuguese India	633 000	111 000	51 400	9 500	—	0.21
Siam	546 385	546 385	8 350	548 035	—	0.33
Sri Lanka	1 120 777	1 100 000	1 100 000	—	—	0.113
Solomon Islands	100 160	95 800	1 000	94 800	—	—
Thailand	20 000 000	6 000 000	3 016 808	2 983 192	FOA	0.25
Viet Nam	20 000 000	4 400 000	3 000 000	1 400 000	FOA	0.007
Total	6,872 062	276 443 436	81 835 243	194 614 193	—	—

Based on official government statistics. WHO questionnaire also asked that the information is of comparable from one country to another. The lack of information in the data received and in the methods of calculating costs.

The cost in US currency has been calculated on the basis of the following exchange rates (equivalent of US \$1.00 in local currency):

Afghanistan—21 Afghanis
Burma—4 762 kyats
Ceylon—4772 rupees
China—NT \$15.50
India—4 762 paise

Indonesia—11.4 rupiah
Malaya—Malayan \$3.03
Netherlands New Guinea—3.8 guilders
Philippines—2 pesos

Portuguese India—4 762 rupees
Sarawak—Malayan \$3.03
Thailand—12.65 bahts
Viet Nam—35 piastres

^a Field Operations Administration of the USA, 1954.

^d All persons in 1954, employed.

chiefly executed by military messengers or drafted
/ 1954
drugs

The evidence that it was possible, by residual insecticide spraying operations to terminate malaria transmission over wide areas was reviewed and the Conference participants concluded that it was advisable to make eradication of the disease the ultimate goal of nation wide malaria control programmes

In this connexion, it was emphasized that there is a great need for co ordination of antimalaria operations in the different sectors of a country, as well as between countries. This co ordination should take account of space time, and efficiency. The persistence among controlled areas of uncontrolled areas, or of sectors lagging behind with regard to effectiveness of results must be avoided, since this would delay the moment at which it would be safe to discontinue spraying even in the areas considered controlled. It was pointed out that any such delays not only prolong the duration and expenses of malaria control programmes, but also increase the danger of the development of insect resistance to the insecticide being used. Obviously to ensure co ordination adequate national malaria services are necessary. Malaria advisory committees might also be required in some circumstances and exchange of technical information with WHO assistance would help in the development of programmes.

The problem of possible development of insect resistance to insecticides has made co ordination of programmes between countries essential. If a country has eradicated malaria it might still run the risk of re infection from surrounding countries which are still highly malarious. Inter country agreements are called for so that eradication may be obtained in as large a zone as possible and the danger of re introducing malaria vectors from outside may be minimized.

Appropriate legislative measures will often be a necessary support to nation wide programmes aiming at malaria eradication. Countries having antimalaria enactments

based on older forms of control may need to revise these in the light of modern objectives and methods.

It was suggested that all national malaria services should adopt standardization of techniques, procedures and reports as much as possible—for example by following the indications given in *Malaria terminology*⁵ adhering to the system of uniform reporting of field research proposed by the Malaria Conference in Equatorial Africa,⁶ and adopting the patterns of tabulating results and calculating costs of spraying campaigns which have been followed during the last five years by malaria personnel in WHO assisted projects in different parts of the world.⁷

An attempt was made to define the point at which malaria eradication may be said to be attained—the time at which malaria has ceased to be endemic. It was generally agreed that the absence of any fresh case of indigenous malaria for a minimum period of three years would be an acceptable indication of malaria eradication. To apply this criterion it is essential to have an adequate organization for the discovery and diagnosis of cases of malaria. In some areas it might be useful to have entomological evidence to support that provided by the examination of infants, children and adults.

There was full agreement on the important point that it is desirable to interrupt residual spraying as soon as feasible not only to reduce costs of malaria control but also as a means of preventing or at least retarding the development of resistance to insecticides in the vector mosquitos. The moment at which spraying may be safely interrupted is not necessarily the final end point of malaria endemicity in a given locality, and in each country criteria for interruption of residual spraying should be set up by competent

⁵ Covil O. Russell P. F. & Swellengrebel N. H. (1953) *Malaria in man*. 1st rep. of a draft committee appointed by the World Health Organization. Geneva (World Health Organization Monographs No. 13).
⁶ *Wld Hlth Org J* 1951 38 63.
⁷ *Chron Wld Hlth Org* 1955 9 51.

authorities who understand thoroughly the local epidemiology of malaria. Adequate surveillance measures should be initiated before spraying is stopped and provision should be made for immediate emergency resumption of spraying operations wherever and whenever the need arises. Another point that was stressed was that places chosen for interruption of residual spraying should be surrounded either by natural barriers or by areas from which malaria is absent or has already been eradicated.

The eradication of malaria by residual spraying alone may not be possible in some areas particularly in those parts of the equatorial wet seasonless zones where the habits of the vector tend to reduce contact with the insecticide. In such areas residual spraying should perhaps be abandoned in order to avoid the development of insect resistance to the insecticide and other control

methods should be substituted. For example in certain small *A. minimus* areas that have not responded to DDT residual spraying for several years it should be possible to eradicate malaria by a combination of pyrethrum house spraying, paris green larviciding and the appropriate administration of drugs. In other places sanitary measures to prevent the breeding of the vector might provide the solution.

It was emphasized that when DDT resistance has developed replacing this insecticide by dieldrin, chlordane, BHC or lindane might not be effective for long since experience suggests that when resistance has developed in some insects towards one member of the group of chlorinated hydrocarbons it may quickly extend to the others. It is inadvisable to continue indefinitely to attempt malaria control by residual spraying with chlorinated hydrocarbon insecticides.

FREEZE-DRIED BCG VACCINE

The sensitivity of liquid BCG vaccine to light and temperature has from the first complicated the organization and carrying out of mass vaccination campaigns against tuberculosis. In tropical and subtropical regions especially careful precautions must be taken to prevent deterioration of the vaccine over the long distances from production centre to vaccination centre. This deterioration takes the form of a decrease in the number of viable bacilli with a consequent reduction in the efficacy of the vaccine.

The common use of the freeze-drying method of conserving vaccines, sera and various biological preparations suggested that consideration be given to the possibility of applying this technique to BCG in the hope of obtaining a product which would be more

stable and at the same time retain its full potency. In Japan in particular experiments along this line were already undertaken in 1943. In 1946-47 research started on mass production methods and in 1949 when the provisions concerning tuberculosis of the Preventive Vaccination Law came into force large scale manufacture commenced in earnest. New problems then emerged and it became evident that there were considerable differences between the experimental preparation of dried vaccine in a laboratory and mass production. Studies were therefore promoted steadily at the same time as mass production continued.

Papers by Japanese authors published for the most part in Japanese journals have so far been accessible to workers in other coun-

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⁵ Covell G Russell P F & Swellengrebel N H (1953) *Malaria terminology* report of a drafting committee appointed by the World Health Organization. Geneva (World Health Organization Monographs No. 13).
⁶ WHO Weekly Rep 5 1951 34 63
⁷ Chr n WHO Weekly Org 1955 9 51

INCIDENCE OF POLIOMYELITIS IN THE AMERICAS 1945-1954

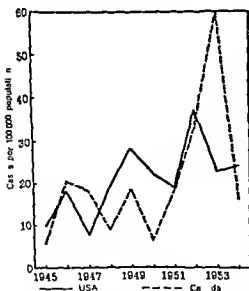
In an analysis of the available statistics on the incidence of poliomyelitis in the Americas over the ten year period 1945-54¹ the Pan American Sanitary Bureau which acts as WHO Regional Office for the Americas provides useful data on a subject of great current interest. This analysis based on reports of notifiable diseases sent to the Bureau by the governments of the Region supplements recent WHO studies of the same nature². Although the data on which the analysis is made are not strictly comparable because of the considerable variations in the completeness of reporting poliomyelitis in

different countries they do show trends in incidence and reveal the occurrence of epidemics.

Case rates during the period 1945-54 were relatively higher in Canada and the USA than in other countries of the Americas (see fig. 1). However the highest rate recorded was that of an outbreak in 1954 in Costa Rica when 1081 cases were reported and the case rate was 118.1 per 100 000 population (fig. 2). Two islands of the Caribbean, Jamaica and Trinidad also had epidemics in 1954 with the case rate for the former being 42.7 and that for the latter 27.1 (fig. 3).

The case rates for eleven other countries of the Americas are illustrated in figures 4-9. In six of the remaining countries of the Region — Bolivia, Ecuador, Peru, Colombia, Dominican Republic and Haiti — the number of cases was small and the case rates were generally below 2.0 per 100 000 population. Only

FIG. 1. REPORTED CASES OF POLIOMYELITIS PER 100 000 POPULATION IN CANADA AND THE USA 1945-54.

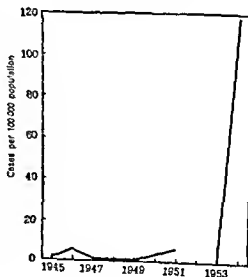


Health Statistics, 1955 4: 3-11. The present article is drawn from this PASB publication.

Freyche, M. J. & Nielsen, J. (1955) *Incidence of poliomyelitis since 1940*. I. *Poliomyelitis* (World Health Organization Monograph Series, No. 26), p. 59.

Freyche, M. J., Payne, A. M. & Ledervy, C. (1955) *Poliomyelitis in 1953*. *Bull. World Health Org.* 12, 295 (Summary in *Chron. World Health Org.* 1955 9: 155).

FIG. 2. REPORTED CASES OF POLIOMYELITIS PER 100 000 POPULATION IN COSTA RICA 1945-54.



tries only in the form of very brief summaries. In publishing a study on this subject by Dr Y Obayashi¹ in the *Monograph Series*, WHO aims to put at the disposal of those interested in freeze dried BCG vaccine the data at present available and the conclusions to be drawn from them.

According to Dr Obayashi the difference between liquid vaccine and dried vaccine is more quantitative than qualitative. During the process of drying at a low temperature a certain number of bacilli are destroyed. These losses may be reduced to a minimum if cultures (on Sauton medium) in the later logarithmic phase of growth are employed. If these losses are compensated for—e.g., by increasing the dose of vaccine injected from 0.04 mg to 0.1 mg—then one obtains with an equal number of viable bacilli a preparation producing the same degree of allergy as the liquid vaccine. It seems as some workers have suggested, that a minimum number of bacilli are necessary if the vaccine is to be effective and that any increase above this minimum number of bacilli does not appreciably affect the allergenic potency. According to Japanese studies at least 400 000 units per vaccinal dose (10 million per mg of vaccine) are necessary to ensure a tuberculin positive conversion rate of 90%. Most of the dried vaccine prepared in Japan has now reached this level.

Stability is one of the main characteristics of dried vaccine. During the first few months after preparation the vaccine loses some of its viability, but then it becomes stabilized. The vaccine still retains its high antigenic potency after preservation in a refrigerator for a year, after two years, its potency is

slightly lower. It is thus possible to use with confidence long after preparation a dried vaccine which has already reached the stage of stable viability—and whose viability has been demonstrated beforehand by the cultivation method. From this point of view dried vaccine has a distinct advantage over liquid vaccine. Such a control is all the more valuable because the viability of a vaccine frequently varies from batch to batch. In Japan, dried BCG vaccine may be used up to 15 months after its preparation i.e. a year after it has been submitted to control tests.

A fall in allergenic potency occurs when the vaccine is kept at high temperatures (22°C, 30°C, 37°C) or at room temperature in the summer. To retain its effectiveness dried vaccine should not be kept at a temperature above 5°C.

The dried vaccine is sensitive to light but to a lesser degree than liquid vaccine. Exposure of the dried vaccine to light should be avoided and it is planned to use coloured glass ampoules to give protection against light.

The vaccine should be kept in ampoules sealed under vacuum and the moisture content should not exceed 4%. Thus far it does not appear that greater stability is obtained on decreasing the moisture content below 1%.

Despite the advantages which in Japan have led to its being preferred to liquid vaccine the dried BCG prepared at present cannot be considered as fulfilling all the conditions required for practical application on a large scale. In particular it has not yet been possible to produce a vaccine with satisfactory keeping qualities at relatively high room temperatures. This problem which is of considerable practical importance will be the chief object of future investigations by Dr Obayashi.

¹Obayashi Y (1955) *Dried BCG vaccine*. Geneva (World Health Organisation Monograph Series No. 25) 400 pages. Price £1 15s \$5.00 or Sw fr 15.—(clothbound)

FIG 7 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN PANAMA
AND VENEZUELA 1945-54

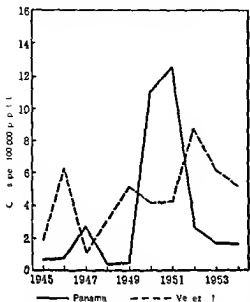


FIG 8 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN BRAZIL
AND URUGUAY 1945-54

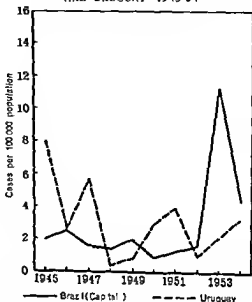
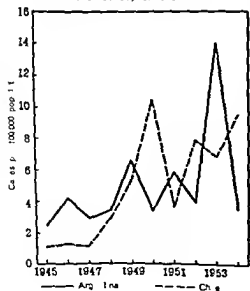


FIG 9 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN ARGENTINA
AND CHILE, 1945-54



one case was reported in Haiti during the ten year period — in 1947. Data for Honduras and Paraguay were not complete enough to be presented graphically.

Data for the territories in addition to those shown for Jamaica, Trinidad and Puerto Rico (fig 3 and 4) are also interesting in several islands no cases were reported for many of the years but in Grenada for example two cases occurred in 1953 and 19 cases in 1954 (a case rate of 22.5 per 100 000 population) and in Alaska and Hawaii the case rates increased during the period under study being relatively high for Alaska for the past five years (1950 55.9, 1951 26.8, 1952, 56.7, 1953 43.2 and 1954 198.2) and for Hawaii for the past three years (1952, 30.8, 1953 10.9 and 1954 43.9).

In summary the data show an increase in the number of reported cases of poliomyelitis in the Americas during the ten year period studied with particularly severe outbreaks during the past few years.

FIG 3 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN JAMAICA AND
TRINIDAD 1945-54

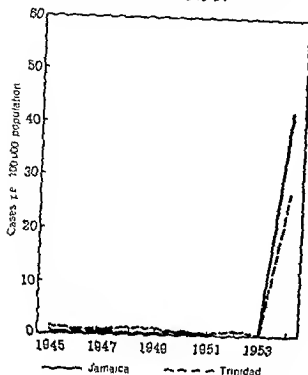


FIG 4 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN CUBA
AND PUERTO RICO 1945-54

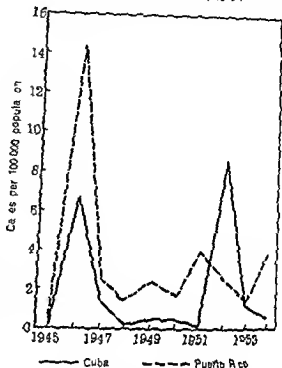
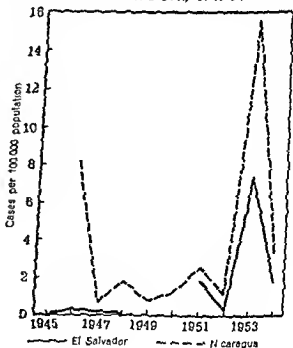


FIG 5 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN MEXICO
AND GUATEMALA, 1945-54



FIG 6 REPORTED CASES OF POLIOMYELITIS
PER 100 000 POPULATION IN EL SALVADOR
AND NICARAGUA, 1945-54



Notes and News

Tuberculosis Control

Changes in the epidemiology of tuberculosis in European countries have been brought about by a reduction in the prevalence of bovine tuberculosis the ageing of populations the increasing application of new methods of treatment general improvements in housing nutrition and medical care and other developments. During the last five years some countries have recorded a 50-60% reduction in the tuberculosis death rate. Rates for new cases however have fallen concurrently by only 5-10.

To study the changes in control methods necessitated by these developments a group of about twenty European public health administrators epidemiologists tuberculosis officers statisticians and clinicians will be meeting in Luxembourg in November 1955 at the invitation of the Regional Office for Europe. Countries with low tuberculosis rates rightly realize that special efforts are needed to reduce the incidence of this disease still further.

New Courses at Istanbul Tuberculosis Centre

Post graduate training for tuberculosis physicians (12th course) and nurses (3rd course) is beginning in Istanbul on 14 September 1955 and will continue until 8 November. The Regional Office for Europe is providing the following lecturers: Dr E. Berthet, Professor E. Bernard, Dr E. Pontefract, Dr D. Thomson and Mlle Y. Turpin. WHO fellows from the African Eastern Mediterranean and European Regions are attending.

Training in the Management of Acute Poliomyelitis

A course given in French on the management of acute poliomyelitis will be held in Paris from 10 to 19 October. This course which will be similar to that held earlier this

year in Copenhagen¹ is being organized by the French Ministry of Health and the Paris Faculty of Medicine with assistance from WHO and the International Children's Centre.

Anaesthesiology Course

The sixth anaesthesiology training course opened in Copenhagen on 5 August 1955. In the preceding five courses 64 WHO fellows from abroad and 59 Danes have been trained at the Copenhagen Anaesthesiology Centre which was established with assistance from WHO.

Training in Insect Vector Control

A training course on the control of insect vectors of disease took place in Rome from 16 May to 30 June 1955. It was organized by the WHO Regional Office for Europe in collaboration with the Istituto Superiore di Sanità and was attended by 16 WHO fellows from the African Eastern Mediterranean and European Regions.

The programme included medical entomology the transmission by insects of pathogenic bacteria rickettsia spirochetes and helminths chemistry toxicology mode of action and application of insecticides the control of malaria and leishmaniasis and fly control as a public health measure.

Malaria Control Pilot Project in North Borneo

A malaria-control pilot project was begun in North Borneo in July 1955 with the assistance of WHO and UNICEF. WHO appointed Dr W. J. Stoker, former Deputy Chief of Malaria Control of the Ministry of Health of Indonesia as malariologist and Professor T. L. Chang who was previously

¹ See Chron. Wld Hlth Org. 1955, 9, 167.

**TABLE 1 NUMBER OF REPORTED CASES OF POLIOMYELITIS
IN CERTAIN COUNTRIES AND TERRITORIES OF THE AMERICAS 1945-54**

Country or territory	1945	1946	1947	1948	1949	1950	1951	1952	1953	1-54
Alaska	—	1	—	1	1	62	33	80	67	335 ^a
Argentina	387	659	467	552	1 103	588	1 015	695	2 579	6 ^a
Bahamas	—	—	—	—	1	—	—	—	—	—
Barbados	—	2	—	—	4	—	—	—	3	2
Bermuda	—	—	—	1	—	—	—	1	1	1
Bolivia	4	10	—	15	7	4	12	7	2	—
Brazil (Capitals)	124	165	109	101	149	65	104	133	944	37 ^a
British Guiana	—	—	4	—	—	2	5	2	—	3
British Honduras	—	—	1	2	3	—	—	—	3	—
Canada	384	2 527	2 291	1 168	2 438	911	2 568	47.5	8 878	2 432 ^a
Canal Zone	2	1	17	10	4	24	1	15	12	9
Chile	58	71	61	167	300	607	214	461	414	23
Colombia ^b	—	—	86	67	65	133	67	29	153	112
Costa Rica	8	39	7	10	6	30	53	9	—	106
Cuba	9	343	74	10	28	78	11	4.0	68	35 ^a
Dominican Republic	9	2	1	2	—	—	—	—	—	—
Ecuador	11	3	35	15	16	53	25	30 ^a	41	3
El Salvador	—	5	3	2	—	—	37	5	151	38
Guatemala	6	3	18	5	45	13	39	66	37	133
Haiti	—	—	1	—	—	—	—	—	—	—
Hawaii	15	25	37	1	22	23	19	161	57	730
Honduras	—	1	3	—	—	—	90 ^a	—	—	—
Jamaica	4	2	6	5	3	13	—	2	4	6.1
Leeward Islands	—	—	—	—	—	—	—	—	—	—
Antigua	—	1	—	—	—	1	—	—	—	—
Montserrat	—	—	—	—	—	—	—	—	—	—
St. Kitts Nevis	—	1	—	—	—	—	—	—	4	—
Virgin Islands	—	—	—	—	—	—	—	—	—	—
Mexico	31	47	212	653	683	804	1 834	771	1 787	23
Netherlands Antilles	—	—	—	—	—	7	—	—	—	—
Nicaragua	—	76	7	16	8	13	28 ^a	14 ^a	181	41
Panama	5	6	20	2	4	88	102	22	15	15
Paraguay	—	14	51	15	16	14	—	—	—	51 ^a
Peru	36	49	21	36	35	30	53	127	79	73
Puerto Rico	10	307	57	30	52	38	89	57	31	87
Trinidad and Tobago	9	5	5	8	6	1	2	6	1	127
Uruguay	181	60	128	10	22	73	97	76	36	85
USA	13 624	25 698	10 877	7 726	42 033	33 300	28 3.6	57 879	35 572	3 740 ^a
Venezuela ^b	27	98	21	69	122	110	121 ^a	262 ^a	193 ^a	167 ^a
Virgin Islands (USA)	—	3	1	—	—	—	—	2	—	—
Windward Islands	—	—	—	—	—	—	—	—	—	—
Dominica	1	—	—	—	—	—	—	—	—	19
Grenada	—	—	—	—	—	—	—	—	2	—
St. Lucia	—	—	—	—	1	—	—	—	—	—
St. Vincent	—	—	—	—	—	3	—	—	—	—

— Data not available
— None

^a Provisional and incomplete
^b Reporting area

DRIED BCG VACCINE

YOJI OBAYASHI

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- 5 Culture period of BCG on Sauton medium
- 6 Method of freeze-drying
- 7 Effect of freeze-drying on potency of BCG vaccine
- 8 Effect of storage on viability and potency of BCG vaccine with special reference to storage temperature
- 9 Effect of light on viability and potency of BCG vaccine
- 10 Effect of degree of vacuum on preservability of dried BCG vaccine
- 11 Effect of residual moisture on preservability of dried BCG vaccine
- 12 Viability and allergenic potency of mass-produced dried BCG vaccine

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- 5 Prevention of kwashiorkor
- 6 Nutrition education in the maternal and child health (MCH) centre

with the WHO malaria pilot project in the Philippines as entomologist

The project aims to study the malaria situation in North Borneo in order to determine the most effective methods of control. Spraying of premises with residual insecticides and other control methods will be tried on an experimental basis and local personnel will be trained in the various phases of malaria control work. It is hoped that the pilot project may subsequently be expanded into a full scale malaria control programme with the object of eradicating malaria from the country.

Trachoma in the European Region

Since 1950 several European governments have sought WHO and UNICEF assistance in intensifying existing national anti trachoma campaigns. Interest has been focused chiefly on the use of antibiotics in mass treatment projects and satisfactory results have been obtained in the course of school treatment programmes involving already more than 100 000 trachomatous children. Equally important have been advances in knowledge of the epidemiology of trachoma and in the control of factors favouring transmission of infection. Joint WHO/UNICEF programmes are in operation in Morocco, Tunisia, Yugoslavia and Spain.

The participation of the European Regional Office in anti trachoma projects consists of consultant visits, the award of fellowships, the engagement of project personnel, inter country co ordination of programmes, and the interchange of information and practical experience. Assistance from UNICEF includes provision of antibiotics and other drugs, diagnostic and laboratory equipment, and transport.

Survey on Health and Welfare Workers

In 1950 the European offices of the Rockefeller Foundation and the World Health Organization decided to sponsor jointly a survey of social services in England and France with the principal aim of defining the type or types of health and welfare workers best suited to meet the needs of the family. The rapid development of health education, medical and psychiatric social services, social welfare and other family services in many countries pointed to the value of such a study. The fact that countries with comparatively highly developed health and welfare services were questioning whether their services were best meeting their needs was an additional justification for the investigation. The survey has now been completed and a report on the work may be published before the end of 1955.



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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HOSPITALIZATION OF MENTAL PATIENTS

Reprinted from the
INTERNATIONAL DIGEST OF
HEALTH LEGISLATION

Volume 6, No 1

This study is a comparative survey of the methods of hospitalizing the mentally ill in more than thirty countries. The principal chapters deal with the hospitalization of mental patients, the care of certain special categories (mental defectives, alcoholics, epileptics, etc.), safeguards against arbitrary detention, and trends in current legislation. Six tables, furnishing a synopsis of the main admission procedures, are appended.

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SCHOOL HEALTH SERVICES IN EUROPE

WHO Conference

Within the general framework of services organized for the protection of children school health services assume a heavy share of responsibility control of the communicable diseases of childhood surveillance of growth and development the detection of diseases of physical and mental defects and of psychological disorders health education first aid and occasionally medical treatment. School health services require constant revision for although certain health needs of children remain the same and are common to all countries new problems continually arise to take the places of those which have been solved. Then too there are special problems which are peculiar to certain parts of the world.

In order to promote the development of programmes designed to meet the health needs of school age children WHO created in 1949 an Expert Committee on School Health Services which devoted its first session to the establishment of general directives and methods of studying ways to improve such services. Pursuant to recommendations of this committee¹ the WHO Regional Office for Europe arranged for a travelling study group to observe the school health services of Denmark and of the Netherlands in April and May 1953 and in 1954 in Grenoble it organized a European Conference on School Health Services at which twenty two countries were represented. There were interesting exchanges of views at this conference the purpose of which was to study the elements essential to school health services including the legislative provisions governing their organization and the persons

engaged in school health activities. What follows is a summary of the report on this conference.

SCOPE OF SCHOOL HEALTH SERVICES

In most European countries the proportion of school age children under the supervision of the school health services is high in the United Kingdom for example 99% of children in this age group are covered by school health services. However owing to lack of school medical officers and the necessary material resources the percentage is very low in certain other countries.

Although in general the existing school health services meet the needs of elementary school children the same cannot be said with regard to those attending secondary and technical schools. In about half the countries of Europe secondary school children are not subject to medical supervision or are examined only when the educational authorities themselves take the initiative. The same applies to children attending private schools. In many countries the school health services do not cover technical and professional institutions even though the pupils in such schools are required to make a greater effort than those of the same age attending non technical ones.

With regard to universities it would be desirable to adopt universally the practice of preventive medical examination with special emphasis on systematic detection of pathological conditions—tuberculosis in particular—which constitute a danger to the group. However a general clinical examination for the purpose of informing the student of his state of health could be optional.

SCHEDULE OF MEETINGS

4-11 October	Expert Committee on Insecticides sixth session Geneva
6-12 October	Study Group on Juvenile Epilepsy, London
10-15 October	Expert Committee on Biological Standardization ninth session Geneva
10-16 October	PASB/WHO Seminar on Preventive Medicine Vina del Mar Chile
13 October 3 November	FAO/WHO Seminar on Nutrition Education and Health Education Baguio Philippines
17-22 October	Study Group on Rehabilitation of the Deaf and Partially Deaf Child Geneva
24-28 October	Study Group on the Measurements of Levels of Health, Geneva
24-29 October	Expert Committee on Professional and Technical Education third session Geneva
24-29 October	Expert Committee on Drugs Liable to Produce Addiction sixth session Geneva
7-11 November	Study Group on Arteriosclerosis Geneva
10-24 November	International Conference on Yaws Control Enugu Nigeria
15 November 3 December	Seminar on Public Health Administration Egypt and Sudan
17-26 November	Study Group on Basic Nursing Curriculum Brussels
23-26 November	Study Group on Leptospirosis, Amsterdam
28 November 2 December	Study Group on Tuberculosis Control Luxembourg
28 November 6 December	Second African Malaria Conference Ibadan Lagos Nigeria

The mention of manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature which are not mentioned. Proprietary names of such products are distinguished by initial capital letters.

The national school health service may be administered—or the various local services of the country co-ordinated—by the ministry of public health (Germany Iceland Italy Monaco Morocco the Netherlands Tunisia) the ministry of education (Algeria Belgium France Greece Sweden Switzerland Turkey United Kingdom) or these two together (Denmark Spain). However, whether or not the school health service is centralized, liaison at both local and central levels between educational authorities and health authorities is essential. In the United Kingdom the same medical officer is in charge of school health matters in the Ministry of Education and the Ministry of Health. In Norway the director of the school health services is also adviser to the ministry responsible for education. In Finland the school health services which have previously been the responsibility of the educational authorities will henceforth be entrusted to the health ministry. The aim of this transfer is to ensure continuous supervision of the health of children from birth to adolescence.

THE SCHOOL HEALTH TEAM

Whatever the number and type of staff available, it is essential that school health programmes be planned and implemented in a spirit of co-operation by the various people responsible for children's health. School health teams—very complete in a number of European countries—generally comprise school doctors, school nurses or assistants, health educators, pupils, families, and on occasion other doctors such as general practitioners, social service medical officers and specialists.

School medical officers

In the countries belonging to the WHO Region for Europe, school medical officers fall into the following categories: full time

school doctors, specialist or non specialist, who are either State officials serving local communities or doctors working under government contract; public health physicians who act as medical officers in schools and elsewhere; private practitioners often appointed on a permanent basis to supervise the health of a given number of children; district medical officers in certain regions in which the population is very scattered (e.g. certain areas of North Africa and Norway and Sweden) and in which one medical officer is responsible for all tasks within the compass of social medicine.

The respective advantages and disadvantages of systems based on full or part time school doctors have been considerably discussed. It is obvious that the number of full time school doctors can be somewhat limited, which facilitates their supervision and regulation and the control of their activity. It is easier to assure the regularity of their work and most important, they enjoy the complete co-operation of the teaching staff because they are completely integrated into the educational system.

On the other hand, the inconveniences of a system based on full time school medical officers are also well recognized: the work of these doctors is not sufficiently varied, which means that a certain lack of interest too frequently marks the performance of their tasks and the repetition of school medical examinations tends to give them a routine character. The conference participants were aware of the necessity to counteract this tendency and to look for ways of adding interest to the work of the school doctor. It was suggested, for example, that school physicians should have more access to work in hospitals.

The functions of full time school medical officers were defined as follows at the conference:

(1) Initial examination of children entering school for the first time; periodic and special examinations

To avoid the risk of tuberculous infection among schoolchildren, persons working or living in schools should be subject in all countries to compulsory radiological examinations the intervals between such examinations to be determined according to local facilities and conditions. In France all teachers undergo such an examination every two years, and even more frequently if the medical officer deems it necessary. Teachers infected with tuberculosis must give up their posts and they are granted leave with pay to enable them to be treated over a number of years.

Among other tasks school health services should be responsible for the hygienic conditions of school premises. In all phases of construction and utilization of school premises, the medical service should ensure that hygienic requirements be met.

Recent years have seen the development of medical services for the correction of defects for which no specialized care was previously provided—for example speech therapy clinics for children affected with stammering or suffering from the effects of hare lip, and podological clinics for the examination and treatment of defects such as flat foot. Child guidance clinics are becoming increasingly important and the conference participants unanimously agreed that mental health could in the future play a major part in school health.

As a rule in the countries where medical practitioners are sufficiently numerous which is generally the case in Europe the task of the school health service is one of preventive rather than curative medicine. However in the economically advanced countries school health services sometimes include specialized clinics. In the United Kingdom for example where the school medical service is essentially preventive the local education authorities are responsible for the functioning of about 1900 clinics for the treatment of school children suffering from minor ailments,

1300 dental clinics, 500 ophthalmological clinics, 200 orthopaedic clinics, 900 speech therapy clinics, 120 ear nose and throat clinics, 170 artificial light treatment clinics and a few other specialized clinics for the treatment of cardio-rheumatic, paediatric, and, more recently, chiropodological troubles.

In some insufficiently developed countries school health services unquestionably have a curative role to play. Where large numbers of children are suffering from social diseases such as trachoma, malaria, or ringworm, case finding alone would be of little value if the necessary medicaments were not administered at school by the teachers. Absenteeism would disorganize the whole of the school programme and the clinics would be overloaded. North Africa is a case in point.

These examples demonstrate that there can be no theoretical and final definition of the scope of school health services. Between purely preventive work on the one hand and therapy associated with prevention on the other, there is a whole range of types of school medical service and each country must select the type most suited to its economic and social conditions and to its medical resources.

GENERAL ORGANIZATION OF SCHOOL HEALTH SERVICES

In many countries school medical services are organized on a local or regional basis (town, canton, county or province) with or without national co-ordination. This applies to Austria, Belgium, part of Germany, Ireland, Luxembourg, the Netherlands, Norway, Spain, Sweden and Switzerland. The type of organization seems to depend in fact principally on the administrative structure of the country concerned so that if the national administration is centralized the school health service is also organized at the national level.

The national school health service may be administered—or the various local services of the country co-ordinated—by the ministry of public health (Germany Iceland Italy Monaco Morocco the Netherlands Tunisia) the ministry of education (Algeria Belgium France Greece Sweden Switzerland Turkey United Kingdom) or these two together (Denmark Spain). However whether or not the school health service is centralized liaison at both local and central levels between educational authorities and health authorities is essential. In the United Kingdom the same medical officer is in charge of school health matters in the Ministry of Education and the Ministry of Health. In Norway the director of the school health services is also adviser to the ministry responsible for education. In Finland the school health services which have previously been the responsibility of the educational authorities will henceforth be entrusted to the health ministry. The aim of this transfer is to ensure continuous supervision of the health of children from birth to adolescence.

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(1) Initial examination of children entering school for the first time periodic and special examinations

during the years of school attendance medical control examinations and examinations in connexion with vocational guidance towards the end of the period of study

- (2) Participation in tuberculosis case finding.
- (3) Medical control of teaching staff
- (4) Supervision of follow up action subsequent to school medical examinations liaison with general practitioners
- (5) Advice to parents
- (6) Liaison with teachers and participation in school health education programmes
- (7) Liaison with public health medical officers in connexion with case finding and control of communicable diseases in schools possible participation in vaccination campaigns
- (8) Sanitary inspection of school premises
- (9) Advice on questions of food hygiene and diet in connexion with school meals supervision of the health of canteen personnel
- (10) Detection of handicaps in children and medical supervision of the handicapped at school advice to parents teachers and school authorities being on guard for mental and emotional maladjustments
- (11) Medical supervision of school sports
- (12) Maintenance of health cards and preparation of annual statistics and reports
- (13) Special scientific studies and private research
- (14) Medical supervision of holiday camps

This list makes no claim to being complete and in fact, some participants in the conference expressed reservations with regard to certain items. For example in the United Kingdom medical examination of teachers, supervision of school sports activities and control of school meals are not duties of the school medical officer

In some countries a full time school doctor is in charge of 8000 to 10 000 children. This is the case in France, and it was agreed that this is too large a number. In Switzerland the number is 7000 to 8000 in Yugoslavia 3000 to 4000. The conference participants were of the opinion that a school doctor responsible for carrying out annual examinations should not have more than 4000 children under his care

School nurses

The term "school nurse" seems in general to refer to personnel who have received basic training in nursing with in some countries supplementary training in social work. Nurses who are qualified in both fields are also public health nurses (medico social assistants)

Administratively, school nurses are attached to various authorities i.e. to local communities ministries or, sometimes private bodies or other institutions. The countries in which school nurses are mainly on a full time basis are as follows: Algeria Belgium France, Germany, Greece, Monaco Sweden, Switzerland (towns), and Tunisia. Nurses fulfilling school and other functions are found mainly in Austria (municipal nurses), Italy Luxembourg Morocco Sweden (district nurses) and Switzerland (rural nurses)

As in the case of the school doctors the conference participants endeavoured to assess the optimum number of children to be entrusted to a school nurse. In Lausanne (Switzerland) 800 children are under the supervision of one school nurse. In Denmark and Sweden the number is 1500. It seems desirable that a school nurse should not be responsible for more than 1000 to 1500 children

Teachers

Sometimes children are better known and understood by their teachers than by their families even if only for the reason that they spend more time—apart from that taken by sleeping—at school than at home

When a medical examination is to take place the teacher can indicate any child in whom he has detected sight or hearing defects. Teachers sometimes help in sight testing and measuring

The medical examination proper should always be preceded by an exchange of views between teacher and medical officer. Most participants in the conference were of the

opinion that the teacher should be present at the medical examination of young children but that this was not advisable from the period of puberty it was felt however that this matter could be left to the discretion of the doctor in each case since it is not the actual age of a child that counts but his physiological and mental age

While it is necessary at all times to respect medical secrecy it must be recognized that medical supervision loses practically all its value if the teacher is not given pertinent explanations with regard to the medico-pedagogic measures necessary in connexion with a particular child It is therefore the physician's duty to inform the teacher about such measures but without revealing any particulars of a family here dietary or other private nature or anything which it is not really in the interests of the child to reveal

School psychologists

In countries which have school psychologists they too may join in the conversations between physicians and teachers and make their personal observations School psychologists and doctors establish and use joint questionnaires on nutrition general state of health of the child etc

In the Netherlands school psychologists are attached to the schools in the large towns but in the rural areas it is often the school doctor who carries out intelligence tests These tests make it possible to send mentally backward children to special schools In Denmark intelligence tests are carried out as routine practice The consent of parents is asked for any psychological investigation and in this connexion the teachers attach as much importance to contacts with parents as to the examination itself

Parental co-operation

In most countries parents are requested to supply the school doctor either at the

beginning of the school year or some time before the examination with information in writing regarding the child's antecedents A printed questionnaire is generally used for this purpose and it must be admitted that the answers are often very vague and even erroneous Nevertheless the very fact of having to reply to the questions obliges parents at least on that day to concern themselves with the health of the child and this contributes to their health education However badly the questionnaire is filled in it can always furnish interesting information and this system should be continued even if the school nurses have to be called upon in some cases to help parents in filling in these questionnaires

Only the doctor and his nurse—who like him is under the obligation to maintain professional secrecy—must have access to these questionnaires seeing that they may reveal damaging family secrets which must not be divulged

The questionnaire may be a useful means of requesting parents consent to subjecting a child to the tuberculin test if such consent is necessary

Although the presence of parents may be desirable when a child is undergoing his first school medical examination—at about six years—it is not generally to be recommended in the case of adolescents

SCHOOL MEDICAL EXAMINATIONS

Medical examinations constitute a fundamental element in school health Their purpose is supervision of the health and of the harmonious physical emotional and social development of the child

Premises

The school health centre is a group of several rooms specially reserved for the purpose It is preferable to install the centre

within the precincts of a school, but one centre may serve several neighbouring schools. If the school population is scattered, the transport of pupils to the health centre is one solution, but this is not always possible.

A medical office in a school (it may be a permanent medical office, the headmaster's study or even a classroom) has the advantages of keeping pupils in contact with their ordinary surroundings and of avoiding loss of school time but it does not do away with the necessity for sending children who need thorough and specialized examinations to the school health centre.

It is recommended that wherever it is possible to use without overloading them premises normally employed for some health activity (health centres polyclinics) this should be done. In order to facilitate liaison with the medical service for pre school age children it may be possible to use for the school health service the building in which the maternal and child health services are housed. On the other hand school medical premises must always be separate from tuberculosis control dispensaries or clinics for children suffering from acute communicable diseases.

In Denmark and other Nordic countries the general practice is to use health centres in towns and one room of a school in rural areas.

In addition to these various types of fixed premises there are also special vehicles equipped for school medical activities as a whole, or sometimes for certain special activities, such as radiography or dental care.

It is felt that different premises are required for each type of examination i.e. the routine examination should preferably be carried out at the school but for thorough examination children should be sent to the school health centre or to a polyvalent health centre. The type of premises used for the examinations depends to a great extent

on the density of the school population to be examined, on the resources of the services, and on the availability of polyvalent health centres.

Examination methods

The participants in the conference laid particular stress on the necessity for the detection of sight and hearing defects, thyroid disorders, infantile asthma and spinal posture defects. With regard to radiography and microfilm reproduction of radiography of the lungs it was agreed that, in order to avoid undesirable psychological reactions on the part of children and parents all school children including those giving a negative tuberculin reaction, could be subjected to radiological examination which is, in fact, sometimes useful for detecting pulmonary anomalies other than tuberculosis or forms of cardiopathy which have not been discernible by auscultation.

In the sufficiently developed countries mental health should occupy an increasingly important place in school health. Even during the course of the medical examination as it is at present carried out an experienced school doctor can often form an idea of a child's mental health.

Frequency of medical examinations

This was one of the subjects on which there was most discussion. The countries of Europe appear to be divided into two groups—those in favour of and those against systematic annual examination. In many countries in fact much more thorough examination than the annual routine control is carried out every two to three years.

In Germany where examination was previously effected every year recent regulations have introduced the three year system. In Austria also examination is carried out every three years but children of weak constitution or abnormal behaviour are

subjected to more thorough examination. In Denmark the school health resources make it possible to carry out fairly thorough examinations every year. In France the examination is annual but it is very often more or less automatic and it has therefore been decided to try out in certain limited sectors a system of triennial examination with annual case finding examination and examination "on request" when anything abnormal is noted. The examination is carried out every year in Algeria, Greece, Iceland, Italy and Monaco. In Norway the principle of systematic triennial examination has been adopted with annual tests and measuring any child in whom any abnormality whatever is noted is sent immediately to a health centre. A case finding examination is carried out at schools annually and comprises a tuberculin test, radiological examination of the lungs, the taking of various measurements and checking of the sensory organs. In the United Kingdom the examinations take place at the beginning, in the middle and at the end of elementary education, it being understood that any child showing any signs of disorder is sent to the nearest school health centre for a thorough examination.

The conference participants considered it undesirable to put forward any recommendations on the periodicity of medical examinations since this might serve as a pretext in certain underdeveloped countries for the reduction of funds allocated to school health services with unfortunate consequences for these services. It was unanimously agreed that this would be regrettable since it was precisely in the underdeveloped countries that frequent systematic examination was most needed. In fact there could be no question of reducing the activities of the school health services as a whole; it was a matter of the re-distribution of such services so as to make them as effective as possible.

Timing of medical examinations

Whatever the periodicity adopted, the timing of the examinations could be established as follows:

(1) **School entrance examination.** This establishes the condition of the child's health at the time when he is handed over to the school health service. It is a thorough examination carried out if possible in the presence of the parents.

(2) **Examinations during school life** (according to the circumstances and the degree of development of school medical services). These examinations include annual control for the detection of social diseases (e.g. tuberculosis, trachoma, malaria) or even semi-annual examinations (e.g. X-ray examinations during adolescence), complete examination about every three years and special annual examinations for pupils engaging in certain sports activities, children arriving at the age of puberty and adolescents at the age when their resistance to pulmonary disease is low.

(3) **"Request" examinations** the request being made by the physician, teacher, nurse or parents.

(4) **Examinations after any lengthy absence.**

(5) **Final medical examination** at the end of school life, oriented according to the vocation which the pupil intends to follow.

School health statistics and special inquiries

The observations made during school medical examinations do not all lend themselves to statistical presentation. In fact in many cases the diagnosis is not definite and the pathological conditions detected are in the very first stages. Nevertheless it was agreed at the conference that

it would be an error to oppose all statistical analysis and there can be no doubt that school health services have been able to supply much precious data on social health and the general condition of the population. For instance, the statistics compiled from

within the precincts of a school but one centre may serve several neighbouring schools. If the school population is scattered the transport of pupils to the health centre is one solution but this is not always possible.

A medical office in a school (it may be a permanent medical office, the headmaster's study or even a classroom) has the advantages of keeping pupils in contact with their ordinary surroundings and of avoiding loss of school time but it does not do away with the necessity for sending children who need thorough and specialized examinations to the school health centre.

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must at all times be respected. In a very large number of cases—and the proportion will probably increase as time goes on—it is in practice the school health service which is obliged to take the initiative and send the child to a dispensary or to a hospital out-patient department after the consent of the parents has been obtained.

Liaison with other health services

Maternal and child health services When a child is admitted to school it ought to be possible for the school doctor to have the benefit of the knowledge gained by the maternal and child health service which having followed the child since birth has been acquainted with him during important phases of his physical and mental development. This liaison is established automatically in all countries where the school health services are administered by the public health services; that is to say where the same physician directs the maternal and child health centre and the school health service in a given town or district. Where this is not the case every effort must be made by the school health service to establish a link.

Secondary school technical school and university health services The problem is rather complex when the health services for the various categories of educational establishments do not come under a single administration. In any case the elementary school health service should always transmit the school medical documents to the secondary schools and from there they should be passed on to higher educational establishments as the case may be. Nevertheless the conference participants agreed that it might be preferable to transmit only selected extracts of the medical record card as the latter may contain information which should remain confidential. For example the behaviour of a child may have been distinctly asocial at one period of his development, but

this does not mean that the child should continue to bear the same label in later life.

Occupational health services In some countries the question has arisen as to whether it is advisable to transmit school medical documents to occupational health services when a pupil leaves school to become an apprentice or worker. In some cases this might not be in the interests of the young person concerned, as a factory doctor might use certain information obtained from the school medical file to advise against employing him. It was recommended that the greatest discretion be exercised in this respect.

Role of teachers, parents and pupils

A teacher who sees a child every day and who has received all the necessary information from the school doctor is in a position to interrogate a pupil to ascertain whether the necessary steps have been taken or to incite a pupil and his family to do what has been indicated.

Meetings between parents and teachers make it possible to discuss collective problems such as overwork in a particular group of children. Some children have an influence on their comrades and this influence can be used to encourage other pupils to follow up medical recommendations and take an interest in health matters.

DENTAL HYGIENE

In most cases the first visit to the school dental centre is the child's first contact with a dentist and it may be that the milk teeth—and very often the six year molars—are in a very bad condition. It is desirable for this reason that the school dental service should intervene during the year before the child begins school if the necessary treatment of the six year molars is to be undertaken in time. This early care is very important and should therefore have priority over other treatment.

weights and measurements taken in nearly all European countries during and since the Second World War have demonstrated the extent of damage to child health caused by the war and have made it possible to follow every stage of its gradual rehabilitation

The same is also true of the decreased incidence of rickets which has been observed in countries where school meals with milk and vitamins are distributed. The fall in tuberculosis morbidity, the shift of the period of susceptibility to pulmonary disease to later age groups in certain countries and the decrease in the rate of positive reactions to tuberculin tests have been ascertained most frequently by means of statistics obtained from school and university health services

Although there can be no question of imposing the same methods on all European countries, neighbouring countries which have school populations with the same ethnological, economic and pathological characteristics would find it an advantage to reach agreement on common standards which would allow useful comparisons to be made throughout a group of countries, and subsequently facilitate utilization of statistics on an international level. The *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death* should be made the basis of all statistical work in connexion with diseases during school age.

In addition, certain special inquiries on such disorders as goitre, asthma, albuminuria, and diabetes among schoolchildren might, instead of being limited to one country, be extended over a group of neighbouring countries.

FOLLOWING UP SCHOOL MEDICAL EXAMINATIONS

Medical activities in schools are of value only in so far as children have the possibility of benefiting from treatment. If there are no such possibilities, the school health services must create them by setting up dispensaries and specialized centres as needed.

Therapeutic measures demand contact with families and co-ordination with the

activities of the general health services of the region concerned.

Liaison with families and general practitioners

The success of the school health service will depend on the school doctor and school nurse's keeping in close touch with parents and on the parents' understanding the significance of the therapeutic measures and following their advice. Well equipped premises and fully documented files may assist the work, but only proper contact with the family can give human value to the work of the school health team.

Such contacts may be made by personal conversation which enables the doctor to give the parents detailed explanations and often to receive interesting particulars which throw a clearer light on the case; telephone conversations, the current practice in Sweden for example; simple notification in writing giving a routine report on the child's health when no special pathological condition has been detected, or a letter if such a condition has been discovered. In this latter case the doctor will explain the symptoms and suggest the treatment to be applied. In France for example a printed letter card is sent worded so as to enable the general practitioner to whom the parents forward it to return it to the school health service with his observations, thus making sure that some therapeutic action is taken. Health cards have certain disadvantages: parents lose them or children forget to bring them on the day of examination.

Contacts with parents provide excellent opportunities for health education of families. Such contacts should in fact be established even when there is no pathological condition to discuss.

Liaison with general practitioners is maintained in various ways according to the country. In some it is considered essential that all communications to the family doctor be transmitted by the family, whose prerogative

The results of investigations undertaken in Sweden in 1939 1941 and 1943 coincide with the general figures for school work in 1931 in the USA summarized hereunder

<i>Age</i>	<i>Hourly</i>	<i>Hours of</i>	<i>Total hours not per</i>	<i>Hours of</i>
	<i>work</i>	<i>school</i>	<i>week on school work</i>	<i>school work</i>
7	12	10	22	12
8	11½	9½	21	18
9	11½	9	20½	21
10	11½	8	19½	27
11	11	8	19	30
12	10½	8	18½	33
13	10	8	18	36
14	9½	8	17½	39
15	9½	8	17½	39
16	9	8	17	42
17	9	8	17	42
18	9	8	17	42

The problem of "overwork" in schools can be solved only through the collaboration of teachers and school doctors and with an understanding attitude on the part of parents

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Certain countries have a tendency to lay too much stress on health education in school programmes which causes some people to think too much about their health Moreover an excess of zeal in health educators may create in children phobias and anxieties which should be avoided Health educators who approach the problems of alcoholism and tobacco for example should not lose sight of the fact that any severe judgement passed even indirectly by the school on the family may have serious repercussions on a child's mind

On the question of sex education emphasis was laid on the very deep divergencies of opinion and the entirely different angles from which the problem is viewed in different countries since ethnological social moral and theological factors all play their part Children often acquire their knowledge of sexual physiology under deplorable conditions and for lack of some simple advice on matters of sex young people may be exposed to more or less serious mental disorders which sometimes disturb their moral development and have an adverse effect on their studies

In several countries courses of sex education are given only by teachers who accept the responsibility for such courses or by school medical officers who take an interest

During their school life children should be asked to go twice a year to the dental clinic for a check up of their teeth and any necessary treatment

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HEALTH AND SCHOOL WORK

All countries recognize that overwork exists in certain types of school although it may not affect all age groups. The word *overwork* is not appropriate for the condition often is one not only of too much work but also of anxiety arising from a whole set of complex circumstances

Factors in fatigue

The very varied factors leading to school fatigue may be classified as follows

(1) Physical factors—

- (a) journey between home and school
- (b) seasons climate
- (c) paid work outside school hours
- (d) various amusements
- (e) excessive sports activities

(2) Pedagogic factors—

- (a) intensive work in secondary and technical establishments which is especially harmful during the period of puberty
- (b) "cramming" as examinations approach particularly on the part of university students
- (c) presence of backward children in classes beyond their level
- (d) mistaken orientation of pupils obliged to study subjects for which they have no aptitude "pushing" of children by parents who are lacking in understanding or are over ambitious

(e) the presence of more and more physically handicapped children in schools in certain countries as a result of the reduction of infant mortality

(f) overcrowded classes which make school work heavier

(g) inconvenient timetables because of the short age of school premises and teachers in certain countries some of the children attending in the morning and others in the afternoon

(h) distribution of terms and holidays without due regard for health considerations

(i) excessive homework owing to lack of understanding of children's physiological needs on the part of some teachers and to lack of surveillance by parents who allow late work.

(3) Mental factors—

(a) family troubles

(b) family atmosphere non-conducive to intellectual work owing to lack of general culture or material resources such as shortage of accommodation, lack of peace and quiet during homework hours, exaggerated participation in domestic work

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(1) reduction in the length of classes (lessons of 40 minutes, two free days per week)

(2) prohibition of child labour during the period of compulsory education or permission in the case of older pupils only and then under very strict control

(3) adjustment of syllabuses, reduction of size of classes application of varied and attractive teaching methods and reduction of homework,

(4) adaptation of teaching to a child's capabilities

(5) co operation between teachers

(6) increased participation by school medical officers in school life and in the organization of syllabuses and timetables

(7) respect for hours of sleep and personal life of the child

The results of investigations undertaken in Sweden in 1939 1941 and 1943 coincide with the general figures for school work in 1931 in the USA summarized hereunder

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8	11½	9½	21	3	18
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10	11½	8	19½	4½	27
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and a typing scheme has been developed which at present includes ten types and a number of subtypes

Considerable progress has been realized in the international standardization of the typing procedure and of the typing phage preparations through the offices of the International Committee for Enteric Phage Typing one of the special committees of the International Association of Microbiologists. This standardization has done much to facilitate epidemiological investigations and to further the control of the enteric fevers. Co-ordinated studies of the theoretical and practical aspects of the phage typing methods are being conducted on an international basis.

Dr Felix stresses the necessity of calculating frequency distribution of types by counting the number of foci due to infection with a given phage type rather than the number of cases or cultures examined. He considers it advisable to count as one focus any number of sporadic cases that are known to be connected with each other and to count separately those cases in which such relationship is unknown or doubtful. While this method still leaves a wide margin of error it gives a more accurate picture of the true distribution of the different phage types and of strains that remain untypable.

The first survey of the geographical distribution of typhoid Vi phage types which was carried out in 1950 revealed that the most common typhoid Vi phage type throughout the world is apparently Type E₁ and that certain types that are rare or that do not occur at all in some parts of the world are quite common in others. A second survey in 1953 covering 27 countries and including the examination of about 15 000 patients led to the same conclusions.

With regard to paratyphoid B phage types an investigation in 1953 of approximately 12 000 patients showed that in nearly all the countries on the continent of Europe

Type "Taunton" was the one most prevalent. Observations in Canada however gave evidence of a quite different type distribution. It was also found that the percentage of paratyphoid B strains that remained untypable by means of the first ten standardized phage preparations was considerably lower than the combined figures for "untypable" and "degraded" Vi strains of the typhoid bacillus—a finding that seemed to confirm an earlier impression that the total number of existing phage types of *S. paratyphi B* may not be as great as that of *S. typhi*.

Work is going forward on the further subdivision of the most common phage types. Efforts are also being made to phage type paratyphoid A which is indigenous to many parts of Asia and Africa but almost non-existent in Europe and America, except for imported infections. On the other hand it is considered unnecessary to attempt international standardization of the phage typing of other members of the *Salmonella* group such as *S. typhi murium* the most frequent cause of food poisoning in man.

Dr Felix points out the public health value of phage typing of the typhoid and paratyphoid bacilli and of world wide surveys of phage types.

In the present era of rapid traffic from one part of the globe to another it is most helpful to public-health authorities to be in possession of up-to-date information regarding phage types that are characteristic of certain countries or regions, from which a patient or carrier originates or through which he or she may have travelled in transit.

On the basis of this knowledge the phage typing centre of any country may occasionally identify a source of infection which is hundreds or thousands of miles away and which has escaped detection by the local health authorities.

In addition to their practical value for epidemiological purposes regular surveys of typhoid and paratyphoid B phage types conducted on a global scale are of importance also from the theoretical point of view. The different phage types and the latent natural phages they produce are destined to play an important part in the study of the genetics of these species and of related organisms.

in the question. The syllabuses are some times submitted for the approval of the religious authorities. In a secondary school in Lausanne, an interesting method is adopted: the school doctor gives a talk and replies to written questions put to him anonymously by the pupils. An exchange of information among the educational authorities and school doctors in various countries on the results of experiments along this line is desirable.

Finally, it must be remembered that all steps taken with regard to sex education must be optional, and that parents must have an absolute right to decide whether or not their children are to be given such instruction.

DISSEMINATION AND INTER-COUNTRY EXCHANGE OF INFORMATION ON SCHOOL HEALTH SERVICES

The school doctor should not have to rely for information on obsolete papers in which everything on health in the school is given in a few dozen pages. If school health

is to be vivid and interesting and if the doctor is to be kept up to date, it is essential that the dissemination of the relevant medical knowledge be properly organized. At the present time handbooks, journals of scientific societies, etc., are far from meeting the requirements. This applies also to the information available to school nurses.

Among the various methods recommended for dissemination of information and interchange of views on school health services, the conference participants mentioned the creation of special study societies which would be open to medical personnel and all other persons interested in school health. These societies, established on a national level or grouping together persons from neighbouring countries speaking the same language and having the same problems, could subsequently be formed into a European or even a world federation which would maintain close ties with WHO, UNESCO and the International Children's Centre.

RECENT STUDIES ON TYPHOID AND PARATYPHOID FEVERS

WORLD SURVEY OF TYPHOID AND PARATYPHOID B PHAGE TYPES

In a recent study Dr A. Felix¹ reviews the development of the bacteriophage method of typing typhoid and paratyphoid B bacilli and summarizes data resulting from international co-operation in enteric phage typing—data which he submitted to the International Committee for Enteric Phage Typing on the occasion of its meetings during the Fifth and Sixth International Congresses for Microbiology.

The establishment of the existence of bacteriophages specific for the Vi form of the

typhoid bacillus and the subsequent successful production of bacteriophage preparations of high specificity for particular strains have proved to be of great value to epidemiologists. The phage typing method reveals strain differences which cannot be demonstrated by any of the customary serological methods. So far, thirty-three types and subtypes of *Salmonella typhi* have been accepted for the typing scheme now in use.

Paratyphoid B fever is more prevalent than typhoid fever, especially in the countries of Europe. During large scale outbreaks in Great Britain in 1941-43, it was found that it was possible to apply the bacteriophage technique also to the typing of *S. paratyphi B*.

Felix A. (1955) *Bull. W.H.O.* 13: 109.

TYPHOID AND PARATYPHOID MORBIDITY AND MORTALITY FROM 1950 TO 1953

Data collected by the WHO epidemiological and statistical services have provided the basis for a report² on cases of and deaths from, typhoid and paratyphoid fevers in different parts of the world from 1950 to 1953. This report reveals a continuing downward trend in the incidence of typhoid and paratyphoid fevers in a number of countries

Europe

In northern Europe (Denmark, Finland, Norway, Sweden) death rates from typhoid and paratyphoid fevers were negligible during the period under review, the highest rate being 0.7 (Finland 1950). Except in Sweden the number of cases was consistently below the 1943-49 median. Paratyphoid was more prevalent than typhoid.

Death rates in central Europe (Austria, Federal Republic of Germany, Switzerland)

were generally somewhat higher than in northern Europe, ranging from 0.08 (Switzerland 1951) to 2.1 (Austria 1950). In varying degrees paratyphoid infections appeared to be more frequent than typhoid ones.

For all the countries of western Europe (Belgium, France, Ireland, Netherlands, United Kingdom) the number of cases of typhoid for the period 1950-53 was below the 1943-49 median. England and Wales and Scotland had the lowest death rates. With regard to paratyphoid, only the Netherlands showed a decrease in prevalence. Pre-eminence of paratyphoid over typhoid infections was noticeable in Scotland, the Netherlands, and England and Wales.

The highest death rates on the Continent were in southern Europe (Portugal [mainland], Spain, Italy, Yugoslavia, Greece). However, for all the countries in this area, the figures for the period reviewed were consistently below the 1943-49 median, except with regard to paratyphoid in Yugoslavia. In contrast with the other parts of Europe, in this region

Bull. Wld. Hlth. Org. 1955 33 373

FIG. 2. ANNUAL INCIDENCE OF TYPHOID AND PARATYPHOID FEVERS, CHILE, 1921-53 (RATES PER 100,000 INHABITANTS)

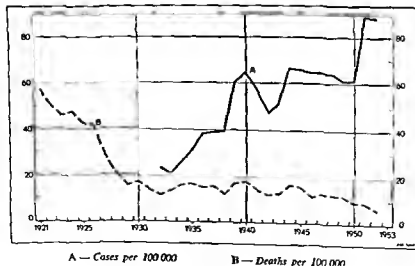


FIG 1 ANNUAL INCIDENCE OF TYPHOID AND PARATYPHOID FEVERS
NORTHERN EUROPE, 1921-53 (RATES PER 100 000 INHABITANTS)

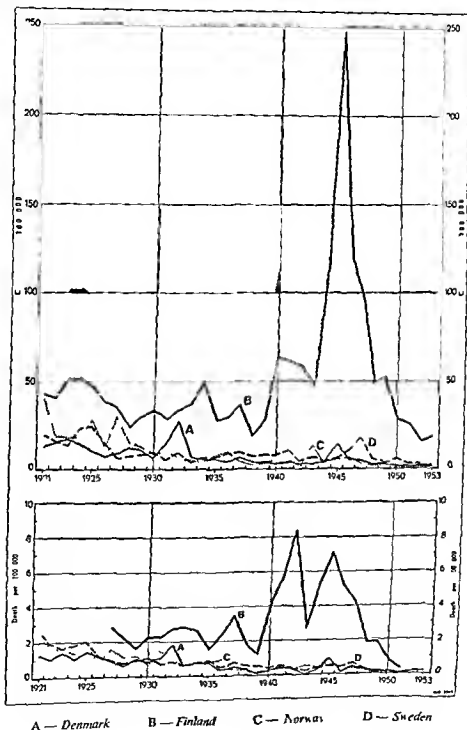
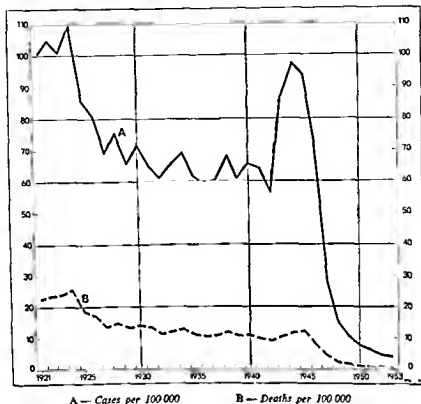


FIG 4 ANNUAL INCIDENCE OF TYPHOID AND PARATYPHOID FEVERS
JAPAN 1921-53 (RATES PER 100 000 INHABITANTS)



typhoid infections appeared to be far more common than the paratyphoid ones

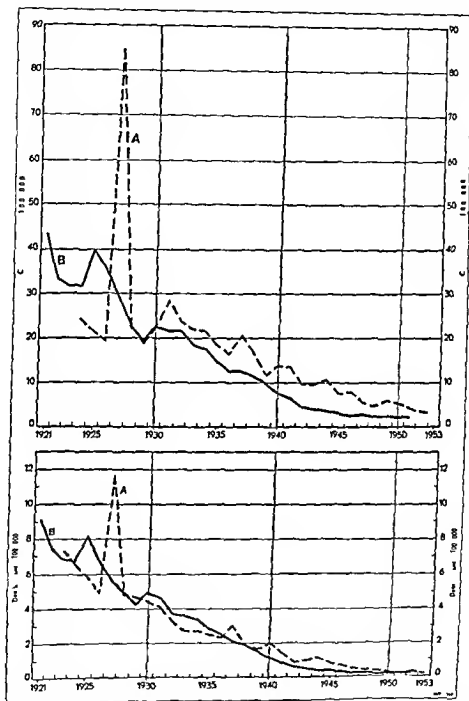
Americas

For the countries for which data are presented Canada and the USA showed the lowest (fig 3) and Mexico the highest death rates. In Canada and the USA the number of cases of typhoid fever reported was below the 1943-49 median. The reverse was true—except for Canada in 1952—in so far as the reporting of paratyphoid cases was concerned. In Mexico and Canada cases of typhoid outnumbered those of paratyphoid while in the USA in 1952 and 1953 about

1900 more cases of paratyphoid than of typhoid fever were reported.

For Central American countries (Costa Rica, El Salvador, Guatemala, Nicaragua) no separate data were available for the two types of infection. Except in Costa Rica there was no apparent decrease in the number of cases as compared with the median for 1943-49. In the Caribbean countries (Cuba, Jamaica, Haiti, Dominican Republic, Puerto Rico, Martinique) on the other hand the figures were below the 1943-49 median with a few exceptions—Haiti in 1952, Martinique in 1950 and the Dominican Republic. In the rest of the continent (Bolivia, Brazil, Chile

FIG 3 ANNUAL INCIDENCE OF TYPHOID AND PARATYPHOID FEVERS
CANADA AND USA, 1921-53 (RATES PER 100 000 INHABITANTS)



A — Canada (excluding Yukon and North West Territories From 1950 Including Newfoundland Excluding Quebec Province in 1923)
B — USA (deaths up to 1932 Deaths Registration Area)

Colombia Ecuador Paraguay Peru Uruguay Venezuela) Ecuador Peru and Chile (see fig 2) showed figures above the median though this might be at least partially attributable to better reporting

Africa

Except in Egypt where the number of cases in 1953 doubled the 1943-49 median the number of cases of typhoid and paratyphoid in the North African countries reporting them was below the median. In the rest of the continent with the exception of Madagascar and Mauritius the cases reported were consistently above the median

Asia

An increase in incidence of typhoid and paratyphoid fevers as compared with the 1943-49 median was noted in Hong Kong Israel Syria and Turkey. The situation seemed stationary in Ceylon the Federation of Malaya and Singapore Colony and there was a decrease as compared with the median in Formosa Sarawak and the Philippines (except for 1950). Japan experienced a noteworthy drop in the number of cases (see fig 4) possibly as a result of a mass vaccination campaign undertaken in that country.

In all the countries of Asia for which data were available typhoid infections considerably outnumbered paratyphoid ones.

Oceania

Here also the number of typhoid cases was greater than that of paratyphoid. No definite trend in prevalence could be seen in the countries of this area except perhaps in Western Samoa where the number of typhoid cases was below the 1947-49 median.

Conclusions

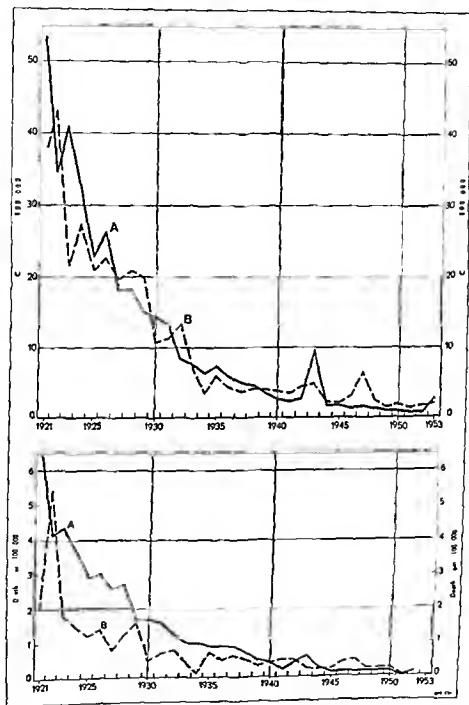
It is difficult to draw any conclusions from the data available since the number of cases of typhoid and paratyphoid fevers registered by national administrations represents only a variable fraction of the actual cases the total number of which cannot be assessed. However it seems that during the period under review the prevalence of water borne typhoid fever was very low and tending to zero in countries with a large urban population enjoying protected water supplies and a temperate climate whereas food borne paratyphoid infections while generally decreasing had not yet reached a negligible level. On the other hand in predominantly rural areas both in the temperate climate and in tropical countries and territories typhoid fever prevalence remained high and judging from the mortality data available this infection was definitely more important as a public health problem than the paratyphoid fevers.

CONTROL OF WILD RODENT FLEAS IN HAWAII

In Hawaii in the Hamakua District wild rodent plague is rife in a coastal strip 32 km long and 8 km wide. In this area there is a stable rat population as the rodents find plentiful food throughout the year. Their burrows are protected by dense vegetation

composed of guava shrubs, hana trees, mango trees and ferns or they are hidden in the fields of sugar-cane. For these reasons rodenticide operations which have extended over a number of years have not been successful; there seems to be no indication of a

FIG 5 ANNUAL INCIDENCE OF TYPHOID AND PARATYPHOID FEVERS
AUSTRALIA AND NEW ZEALAND, 1921-53 (RATES PER 100 000 INHABITANTS)



A — Australia (deaths excluding full-blood aboriginals)
B — New Zealand (excluding Maoris)

decline in wild rodent plague and periods of quiescence are consistently broken by epizootic outbreaks

There are also serious difficulties in controlling fleas on the wild rodents. For example indiscriminate use of insecticides involves the risk of destroying the entomophagous parasites introduced into the country at great expense to combat sugar-cane pests. Moreover there might be a possibility that traces of insecticide spread over the fields could pass into the raw sugar product.

Finally in the lush vegetation and almost impenetrable fields of sugar-cane it is practically impossible to reach the rat burrows for direct dusting with residual insecticides.

Under these special circumstances the question arose of developing a method of using the rat itself as the contactor and disseminator of the insecticide transporting it into its burrow in this way waste of DDT and the indiscriminate spreading of insecticide would be avoided. L. Kartman & R. P. Lonergan have described in a recent article in the *Bulletin of the World Health Organization*¹ a method which has given sufficiently encouraging results to justify application in other zones in which plague is endemic.

Metal bait boxes were constructed containing bait in the form of pieces of coconut or rolled oats. When the rat entered the box it released a mechanism which "showered" it with DDT powder mixed with pyrophylite. When it left the box through the operation of a similar mechanism it received a second dusting. In addition the DDT which fell to the bottom of the box served to coat the underside of the rat.

Stations for the capture of live rats were installed along about 12 km at intervals of approximately 15 m from each other. At

every fifth station there was a DDT bait box. All captured rats were anaesthetized, combed for ectoparasites (which were counted), marked and freed. Rats taken in traps without DDT were used as controls. Where possible in the treated zone and in the control zone burrows were opened and nests examined to obtain data on any possible effects of DDT transported into the burrows by "treated" rats.

The predominant species of rats in the test area were *Rattus rattus* and subspecies and *R. hawaiiensis*.

The purpose of this experiment was to discover whether it would be possible to reduce the flea indices on wild rats to a level which would prevent enzootic plague from developing into an epizootic. Percentage evaluation of the results was complicated by the very small number of fleas on rats in the test area. Nevertheless it was possible to observe a difference of 9% in the rate of infestation as between "treated" and "control" *R. rattus* and of 18% as between the two groups of *R. hawaiiensis*. The rat flea indices were *R. rattus*—0.20 in the controls and 0.13 in the "treated" rodents; *R. hawaiiensis*—0.30 and 0.08 respectively.

Only twenty nests could be examined intact but it was found that the DDT introduced into the burrows by the rats had practically suppressed flea infestation. In a nest of *R. hawaiiensis* chemical analysis revealed 0.720 mg of DDT and 0.014 mg of DDE, of 112.6 g of material examined.

These results although still partial and provisional only suggest that the use of DDT bait boxes may be of considerable value in the control of rodent ectoparasites. The authors propose that the method described be tested on a large scale in zones where plague is endemic for at least a year or for a period sufficient to include significant fluctuations in meteorological conditions and flea indices on field rats.



A End view of box in actual use



B Box with hood removed showing full DDT sacks and bait container with rolled oats

Training of auxiliary public health nurses has been developed in Egypt and Pakistan for some years and with the aid of WHO and USFOA training courses have been instituted in other countries of the Eastern Mediterranean Region including Ethiopia Iran Iraq Libya and Syria The training of these auxiliaries should last at least twelve and preferably eighteen months The instruction covers a wide variety of subjects health care and nursing the sick especially children environmental sanitation with special stress on personal hygiene control of the communicable diseases which are common in the area elementary nutrition especially in relation to local foods maternal and child health care at the nursing level and health education

A somewhat similar type of worker but with additional midwifery training at a higher level is being graduated from schools developed in Pakistan with the assistance of WHO and UNICEF The Ministry of Health has been aided in the establishment of four schools for this type of auxiliary The course lasts 27 months A special effort is made to prepare the trainees to teach the indigenous midwives in the area where they will work

With regard to the training of auxiliary midwives an attempt is being made to orient such training towards public health and preventive practice preparing community midwives to provide simple care at the village level for the mother and child before and during birth and continuing care for the child up to school-entry age A particularly valuable system of training has been developed in Sudan where there are now about six schools giving an eight month course for semi literate or completely illiterate village midwives who subsequently are provided by the Government with a simple midwifery kit and are licensed to practise midwifery

usually in their own villages These midwives however are kept under strict supervision by the district health authorities are recalled for refresher courses and may in extreme cases of incompetence lose their licences

Auxiliary sanitarians

In the countries of the Eastern Mediterranean Region there is need not only for sanitary engineers and fully trained sanitary inspectors but also for auxiliary sanitary inspectors In countries where health services are at a very early stage of development this may be one of the first types of auxiliary to be trained

The WHO Regional Office has recently arranged for the Egyptian Government to conduct a one year course in Arabic for auxiliary sanitary inspectors from nearby countries where such training is not yet given These auxiliaries receive a thorough practical training within limits in all aspects of environmental sanitation appropriate to the type of community in which they will later serve

On a higher level a number of countries—including Cyprus Sudan and Pakistan—are training sanitary inspectors according to the syllabus of the Royal Sanitary Institute in London

• • •

The use of trained auxiliary health workers is giving good results in many countries but it must be stressed that careful planning is necessary before a government embarks upon training programmes and establishes services based on the use of auxiliary workers With careful planning a reasonably adequate health service for rural areas in particular can be built up at low cost in the course of one or two decades pending the time when fully trained professional health and teaching personnel is available

AUXILIARY HEALTH WORKERS IN THE EASTERN MEDITERRANEAN REGION*

In the countries of the Eastern Mediterranean Region the ratio of doctors to population ranges from about 1 to 8000 to 1 to 60 000. There are even countries which do not yet have a single doctor of their own, the entire medical profession being represented by a few foreigners. Some countries with populations of up to five million have no medical schools.

The nursing situation is no better. In the whole Region of approximately 170 million people there are perhaps not more than five or six schools of nursing which would be regarded as adequate by modern standards. The training of other types of professional health staff is similar.

Faced with such a shortage of health personnel and training facilities, many countries of the Region are resorting to the training of large numbers of auxiliary health workers as an emergency solution until adequate professional staff becomes available. In general this training is concerned with three types of auxiliaries: (1) those substituting for doctors, (2) those substituting for nurses and midwives, and (3) those substituting for sanitarians.

Auxiliary doctors

The use of auxiliary doctors has been best developed in Iran, Pakistan and Sudan. In the first two countries the tendency has been to concentrate on medical care with no particular emphasis on training in public health and preventive medicine. In Sudan a simpler type of auxiliary—the medical

assistant—has been developed. Training of medical assistants began in Sudan as early as 1919 on a more or less apprenticeship basis and has been formalized since 1946. Until recently candidates were selected from among men who had already had training as dressers or nurses; they were given an additional 18 months training in medical care and public health. More recently, another school has been developed which offers a three year course to boys who have had no previous experience. At present more than four hundred of these medical assistants are employed in Sudan, mainly in dispensaries in rural and semi rural areas.

In co-operation with the United States Foreign Operations Administration (USFOA) a school for training a similar type of medical assistant is being developed at Gondar, Ethiopia. In this school greater emphasis is being placed on preventive medicine and public health training. When fully established, the school should train 30 assistants annually to help meet the needs of rural health services in particular.

Auxiliary nurses and midwives

There are two main groups of auxiliary nurses: hospital nurses and public health nurses. The former are trained to assist professional hospital nurses; ideally they work under the close supervision of fully qualified professional workers and are subjected to continuous in-service training. A useful hospital auxiliary nurse can be trained in about six months. Where possible arrangements may be made for the best of these auxiliaries to complete a full professional training course.

*Based on an article by Dr J. D. Cottrill, Director of Health Services of the WHO Eastern Mediterranean Region, which was published in *J. Amer. med. Assoc.* 1955 160 237.

Approximately sixty participants from twenty four countries and territories will attend the seminar as professional leaders engaged in nutrition education and health education work. They will include public health medical officers agriculturists nutritionists educationists nurses health educationists cultural anthropologists home economists social welfare workers and publicists. Representatives from the United Nations UNESCO UNICEF US International Co-operation Administration (ICA) and the South Pacific Commission have also been invited to take part in the seminar.

The main purposes of the seminar are as follows:

(a) to exchange information and ideas about the nutrition education and health education programmes now in progress in the participating countries and territories and to discuss the major problems encountered

(b) to explore the basic principles underlying modern health education and to develop a common working philosophy for improving health education and nutrition education in the participating countries and territories

(c) to observe and to demonstrate some of the methods and techniques of health education with special reference to nutrition

(d) to develop practical plans for expanding and improving nutrition education and health education having regard to existing conditions and resources in the various areas

A very important aspect of the preparatory work during the past year for this seminar has been the convening of preliminary meetings in a majority of the participating countries and territories by the governmental authorities concerned in collaboration with the WHO Regional Office for the Western Pacific the WHO Regional Office for South East Asia and the Food and Agriculture Organization. In almost every country representatives from the departments of education health agriculture and sometimes from ministries of planning or social affairs have participated in these pre seminar meetings to assist in developing the organization and content of the seminar programme.

The main topics to be considered at this seminar with nutrition education as the focal point include the following: (1) the principles and process of learning (2) investigation of sociological factors and their relation to changing attitudes beliefs and habits (3) study of the educational methods and approaches most suitable under different circumstances (4) discussion of the health education concepts and experiences needed in the training of personnel at various levels (5) principles of planning organization and co-ordination of education services in health nutrition education home economics agriculture and other relevant fields and (6) consideration of the various methods of evaluating the effectiveness of educational programmes and the usefulness of specific educational methods and materials.

Study Group on the Rehabilitation of the Deaf Child

In infants and young children the existence of impaired hearing is a handicap which may easily be unsuspected since it is not usually associated with obvious signs of disability. The effects of the handicap are however of particular importance at this age if the impairment is severe and is not treated. Speech development will be affected thus depriving the child of normal means of communication. Education becomes a special problem and emotional maladjustment is likely to occur. Although health and education authorities have in the past given considerable attention to the problem of training and educating children with impaired hearing their efforts have been directed mainly towards providing services for children old enough to attend a nursery or primary school.

WHO is convening in Geneva from 17 to 22 October 1955 a study group to consider questions associated with rehabilitation of the deaf and partially deaf child. The whole approach to the problem of children with impaired hearing has been influenced by comparatively recent developments in audiology. It has been shown that most children with a hearing handicap even those who are

Study Group on Juvenile Epilepsy

A WHO study group comprising twelve internationally known experts actively working on different aspects of the problem of juvenile epilepsy is meeting in London from 6 to 12 October. The purpose of this meeting is to survey current knowledge and developments in research, treatment care and services relevant to epileptic children. This entails a review of work in many fields including neurophysiology, electroencephalography, pharmacology, psychiatry, paediatrics, psychiatric social work, and public health practice.

Each member of the group has been asked to supply information on the services in his own country for the care and treatment of epileptic children, answering the following questions:

- (1) What arrangements exist for the ascertainment or registration of epileptic children—either locally or nationally?
- (2) What arrangements are provided by the national or local educational authorities for special schools, home tutors or other special educational provision for epileptic children?
- (3) What voluntary bodies exist to promote or provide the medical, social or educational care of epileptic children?
- (4) What professional organizations of physicians exist which are specially concerned with the investigation and care of epileptic children?

Dr D. A. Pond of the Institute of Psychiatry of London University, acting as a short term consultant for WHO, has prepared a preliminary working paper briefly outlining the present state of knowledge of juvenile epilepsy, to serve as a starting point for the group's discussions. These discussions are expected to cover subjects such as juvenile epilepsy from the physiological and the paediatric points of view, the genetic aspects

of the problem, personality and behaviour disorders associated with juvenile epilepsy, the 'borderlands' of epilepsy, a community programme for epileptic children, and epilepsy as a public health problem.

Professor Fraser Brockington of the Department of Social and Preventive Medicine of Manchester University (United Kingdom) is Chairman of the study group. The other members are: Dr Romanes Davidson, Medical Superintendent, Orphan Homes of Scotland, Bridge of Weir (United Kingdom); Professor H. Gastaut, Faculty of Medicine, Marseilles (France); Dr Peter Henderson, Principal Medical Officer, Ministry of Education, London (United Kingdom); Dr H. Landolt, Medical Director, Schweizerische Anstalt für Epileptische, Zurich (Switzerland); Dr B. Ch. Ledebroe, Secretary General, International League against Epilepsy, Haarlem (Netherlands); Dr William Lennox, Neurological Institute of the Children's Medical Center, Boston, Mass. (USA); Dr Karl Axel Melin, Medical Director, Clinic for Convulsive Disorders, Stockholm (Sweden); Dr Julius Metrakos, Department of Genetics, Children's Hospital, Montreal (Canada); Dr D. A. Pond, Department of Clinical Neurophysiology, Institute of Psychiatry, Maudsley Hospital, London (United Kingdom); Dr F. Sal y Rosas, Lima (Peru); and Dr Hans Strotzka, University Psychiatric Clinic, Vienna (Austria).

FAO/WHO Seminar on Nutrition Education and Health Education

The World Health Organization and the Food and Agriculture Organization are sponsoring a joint seminar on nutrition education and health education which is being held from 10 October to 2 November 1955 in Baguio, Philippines, with the Government of the Republic of the Philippines as the host country.

not so much racial or geographical as related to environmental factors

WHO as an international co-ordinator of health programmes can help to initiate and perhaps correlate studies that might be carried out in many different countries. The Regional Committee for Europe and the Joint FAO/WHO Expert Committee on Nutrition¹ have both suggested that the Organization might give consideration to the public health aspects of cardiovascular diseases. Accordingly the Organization is convening a study group to advise on the steps that WHO could take to assist in furthering knowledge which might lead to effective prevention of degenerative heart diseases. This study group will meet in Geneva from 7 to 11 November. The following disciplines will be represented: epidemiology, statistics, cardiology, pathology, experimental medicine, biochemistry and nutrition. It is expected that there will be about eleven participants from Canada, France, Japan, the Netherlands, Sweden, the United Kingdom, Great Britain and Northern Ireland and the USA.

Second International Conference on Yaws Control

A second international conference on yaws control is being held with the co-operation of the Government of Nigeria in Enugu, the chief town of the Eastern Region of Nigeria from 10 to 24 November 1955. This conference is the fulfilment of recommendations made at the First International Symposium on Yaws Control which was held in Bangkok, Thailand in 1952 and by the Expert Committee on Venereal Infections and Treponematoses at its fourth session in the same year.

At the Symposium the position of yaws control up to that date was discussed. Special attention was paid to the results obtained with the long acting penicillin preparation procaine penicillin G in oil with 2% aluminium monostearate (PAM) which had made possible the success of extensive yaws campaigns. Consideration was given to the best ways of using this new preparation.

At the conference to be held in Nigeria, the developments that have taken place in yaws control in the past three years will be reviewed and future policies will be discussed. Specifically the following practical problems and developments will be considered: (1) seeing all the population at surveys and the possibility of including some other activity with the yaws campaign; (2) treating not only patients with active yaws but also latent cases and contacts; (3) the dosage for mass campaigns; (4) the employment of auxiliary staff and their supervision; (5) resurveys to consolidate the gains of the previous mass treatment; and (6) post campaign activities which will develop the general public-health services of the community and which will absorb the later stages of the yaws campaign.

Many of the large scale yaws-control campaigns now under way throughout the world have been made possible by the co-operation with the national governments at their request of WHO which provides technical advice and of UNICEF which supplies materials and equipment.

Participants in the conference in Enugu will come from many countries outside as well as within the WHO Region for Africa. Among the former are the British Solomon Islands, Fiji, Haiti, Indonesia, Malaya, Morocco, Netherlands, New Guinea, the Philippines, Thailand and Yugoslavia.

Second African Malaria Conference

The Second African Malaria Conference convened by the World Health Organization will be held in Yaba, Lagos, Nigeria from 28 November to 6 December 1955. The First African Malaria Conference was held in Kampala, Uganda five years ago.

The topics with which the conference will deal will be of interest to forty countries and territories. This meeting like the first one will have a technical rather than an administrative character. Malaria is still a problem far from being solved in many places south of the Sahara—a problem which calls for technical research rather than routine administrative measures. In fact, malaria in

¹ See Chron. H.A.H.I.O.B. 1955 9 709

born deaf, have some residual hearing. The aim now is early detection and training to enable the young deaf child to develop hearing and speech in the way that a normal child would primarily through listening. The training advocated is based upon the auditory method adding the visual (lip reading) method at a later stage.

In a few centres where audiology units have already been set up, these are usually associated with university departments of otorhinolaryngology and work in co-operation with public health and education authorities. Where auditory training programmes have been successfully established it has been found that the majority of young children with hearing loss can be trained during the pre-school years so that they are able to attend ordinary school by the age of 5 or 6 that only a few need to attend a special class or school.

The success of such programmes will however depend upon appreciation by all concerned with young children of the need to diagnose hearing impairments in infancy or early childhood and to start training at the earliest possible age. This requires co-operation and team work among otologists, paediatricians, maternal and child health and school health staff, audiologists, psychologists, teachers and parents. Education of the public is also a very important factor.

In convening this study group to which UNESCO, the United Nations and the ILO have been invited to send participants WHO supports the view that the ascertainment and management of hearing handicaps in children should be more widely recognized as a public health problem and that medical and health authorities have a major responsibility in this field. The main topics of discussion will be the prevention of hearing handicaps in children, methods of case finding, diagnosis (particularly in young children), treatment and rehabilitation including the organization of training and education programmes. It is hoped that the study group will provide guidance on ways of meeting the problem of the child with a hearing handicap along lines which are mutually acceptable to health and to education authorities.

The members of the study group will include a clinical otologist, a paediatrician, two audiologists, and a public health administrator, invited by WHO, two specialists in education of the deaf invited by UNESCO, representatives of the United Nations and of the ILO, and members of the UNESCO and WHO secretariats.

Study Group on Arteriosclerosis

WHO has, up to the present, concentrated its work in nutrition on problems of under nutrition and dietary deficiency diseases. While continuing its efforts in this domain the Organization is now turning its attention also to other relationships between diet and health specifically to the possible relationship between habitual diet and cardiovascular diseases in the more highly developed countries and among certain segments of the population in many other countries.

Degenerative heart disease is the most frequent cause of death in North America, in most of Europe and in the more prosperous communities of countries in other parts of the world. This is true not only of the aged, but also of all ages beyond the third decade of life. The increasing dominance of degenerative heart disease is not explicable on the basis solely of the decreasing importance of other causes of mortality or of the changing structure of the population.

The etiology of degenerative heart diseases needs clarification. These diseases have the following characteristics: study of which might contribute to better understanding of their etiology.

(1) They cause widespread morbidity, invalidism and mortality.

(2) Although they are not caused by infective agents they have some of the characteristics associated with diseases of this nature. They are more prevalent in some countries than in others and in certain countries the high incidence of such diseases is confined largely to certain population groups.

(3) Present evidence indicates that the distribution of degenerative heart diseases is

not so much racial or geographical as related to environmental factors

WHO as an international co-ordinator of health programmes can help to initiate and perhaps correlate studies that might be carried out in many different countries. The Regional Committee for Europe and the Joint FAO/WHO Expert Committee on Nutrition¹ have both suggested that the Organization might give consideration to the public health aspects of cardiovascular diseases. Accordingly the Organization is convening a study group to advise on the steps that WHO could take to assist in furthering knowledge which might lead to effective prevention of degenerative heart diseases. This study group will meet in Geneva from 7 to 11 November. The following disciplines will be represented: epidemiology, statistics, cardiology, pathology, experimental medicine, biochemistry and nutrition. It is expected that there will be about eleven participants from Canada, France, Japan, the Netherlands, Sweden, the United Kingdom, of Great Britain and Northern Ireland, and the USA.

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continental Africa south of the Sahara is the greatest challenge facing malariologists at the present time

Reports have been submitted already by the countries taking part in the conference. They show that out of an estimated population of 132 million 116 million—that is 88 per cent—are living in malarious areas. The population protected by residual spraying with insecticides or other methods of control such as anti larval measures or suppressive drugs amounts to only 14 million. Though these are only approximate figures they indicate the magnitude of the problem of malaria in Africa.

An examination of the reports submitted by the governments concerned also reveals that in a few areas residual spraying has proved as effective in Africa as in other parts of the world and that there have been some outstanding successes in the past five years. Malaria has practically disappeared from the island of Mauritius which was notorious for epidemics in the past. Of the island's two vectors *A. funestus* has been completely eradicated and *A. gambiae* though still present no longer seems to be a threat. It is possible that the old *gambiae* population associated with man and carrying malaria may have been wiped out by residual spraying like the entire *funestus* population. On the island of Madagascar 3.6 million persons nearly all the population living in malarious areas were protected by residual spraying in 1953. The anti malaria campaign has been successful there has been a marked drop in the malarimetric indices and the eradication of malaria from this large island 231 250 square miles (592 000 km²) in area is now in sight.

In continental Africa however no such success can be claimed. Conditions are particularly difficult due to the heavy rate of infection of *A. gambiae* and *A. funestus* in many areas. Central Africa has the highest sporozoite rates the heaviest transmission and the highest spleen and parasite rates in the world. Efforts are being made by the governments concerned often with support from UNICEF and WHO to control malaria

under such difficult conditions. Residual spraying with insecticides has not been entirely effective and drugs are being used in various projects together with insecticides.

The Lagos conference will afford an opportunity to examine the various methods of malaria control tried during the past five years and to select the most effective weapons with which to attack malaria in its African stronghold.

Expert Committee on Insecticides Sixth Session

The sixth session of the Expert Committee on Insecticides is taking place in Geneva from 4 to 11 October 1955. This meeting will be devoted largely to questions relating to the equipment employed in the application of pesticides and to measures which might be taken to protect workers handling and applying these materials. The participants will have at their disposal the results of research performed by members of the Expert Panel on Insecticides over the past four years, as well as analyses of the observations made by field workers and manufacturers in many parts of the world on the efficiency and practicability of equipment designed in accordance with the specifications recommended by the Committee at its third session in 1951. As a result, it is hoped that specifications for improved apparatus will become available in the report of the Committee. Particular significance is attached to such specifications at this time on account of the malaria eradication programme being supported by WHO and of the expansion of programmes for the control of other insect borne diseases in many countries.

The Committee's agenda also contains items relating to equipment for the disinsection of aircraft and to the preparation of standards of operational achievement for fogging and misting machines. The Committee will be requested to summarize experience in the use of and to outline research on the application of molluscocides and herbicides.

With the increasing use of toxic insecticides in health programmes the protection of the

worker is becoming exceedingly important. The type of protective clothing respirators and other devices which may be used in field programmes to reduce accidents and intoxication will be among the considerations of the Committee.

The specifications recommended by the Committee will be provided in due course free of charge to all holders of the *Manual of specifications for insecticides and for spray and dusting equipment*.

The following have been invited to attend this meeting: Mr S. H. Fryer, Chief Engineer, Ministry of Supply, Chemical Defence Experimental Establishment, Porton, United Kingdom; Mr L. B. Hall, Chief Equipment Development Service, Technical Development Laboratories, Communicable Diseases Center, US Public Health Service, Savannah, Ga., USA; Mr J. A. Jove, Division de Ingeniería Sanitaria, Dirección de Salud Pública, Ministerio de Sanidad y Asistencia Social, Caracas, Venezuela; Mr F. W. Knipe, Rockefeller Foundation, New Delhi, India; Mr A. T. Lemierre, Directeur adjoint de la Station centrale d'Essais de Machines agricoles, Paris, France; Dr E. Mosna, Istituto Superiore di Sanità, Rome, Italy; and Mr Mahoudus Houshang Rafatjah, Chief of Malaria Control for Iran, Ministry of Health, Teheran, Iran.

Meeting of Expert Committee on Drugs Liable to Produce Addiction

The next meeting—the sixth since 1949—of the Expert Committee on Drugs Liable to Produce Addiction will take place from 24 to 29 October 1955. The sequence of meetings of this committee—almost regularly once a year—is the result of the functions devolving on WHO in connexion with the international control of narcotics, e.g. the Director General of WHO is bound by the relevant international instruments to decide on the advice of an expert committee whether a drug is capable of producing addiction or whether it is convertible into such a drug.

Nearly all of the new drugs on the status of which the committee will have to make a recommendation at its sixth session belong

to the group of so-called "synthetics"—i.e. strongly analgesic substances which are not derivatives of morphine and which are now being synthesized and manufactured in an ever increasing number. The committee will also deal with the important group of substances which can counteract the intoxicating effects of morphine as well as of other narcotic drugs. Another subject for consideration will be the treatment of drug addicts, a topic of increasing significance in view of the disputed value of so-called "narcotics clinics".

The following are expected to attend this session: Sir Ram Nath Chopra (India); Dr N. B. Eddy (USA); Professor G. Joachimglu (Greece); Professor J. La Barre (Belgium); Professor B. Lorenzo-Velázquez (Spain); Professor T. Masaki (Japan); Dr J. R. Nicholls (England); and Professor V. Zapata Ortiz (Peru).

Third Session of Expert Committee on Professional and Technical Education

The third session of the Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel is being held in Geneva from 24 to 29 October 1955. This meeting will be devoted to study of problems related to the training of the auxiliary health worker who has been defined as a "partly trained or partly qualified person who performs tasks which are generally entrusted to fully qualified professional workers". The question of terminology and definition will occupy an important place on the agenda of the meeting.

Recognizing the widespread need to use partially trained health personnel in many of the "under developed" countries, WHO has been encouraging and supporting efforts to develop and improve the training of such personnel. This subject has been considered in the technical discussions held in conjunction with the Fourth World Health Assembly in May 1951 and on a regional basis in connexion with regional committee meetings.

The specific types of auxiliary workers needed for nursing and environmental san-

tation work have already been studied by WHO but there are many other fields in which auxiliary workers are used. The Committee will consider the basic conditions which call for the use of auxiliaries and will try to formulate principles for the establishment of training programmes for them. Experiences in the use of auxiliary health workers in countries at various stages of development are being collected and will help to give the discussions a practical basis. An effort will be made to determine ways of finding out in what situations auxiliary health workers are needed as either a temporary or a permanent feature of the health services of a country.

One of the most substantial contributions which WHO could make towards a better understanding of the role of the auxiliary health worker would be a basic, comprehensive formulation of the need for and utilization and training of this kind of worker. The coming session of the Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel will provide an opportunity for comparing experiences in many parts of the world and may result in recommendations which can serve as a guide for those responsible for training programmes for auxiliary health personnel.

The following are expected to participate in this meeting: Dr C. T. Loo (Taiwan), Dr Min Sein (Burma), Dr R. M. Morris (Southern Rhodesia), Dr V. Puntieri (Italy), Dr T. C. Routley (Canada), Dr J. Senecal (Senegal), Dr Janet Mackie (Thailand) and Dr Leo A. Kaprio (Finland).

Investigation of Care of the Chronically Ill in Israel

Many beds in hospitals in Israel are occupied by the chronically ill and in an effort to find how much of this hospitalization is necessary the Government asked WHO to send a consultant to study the situation and make recommendations. The Organization has therefore sent Dr Juan Moroder of Chile to Israel for six months to make a detailed study of the types of patients in Israeli hospitals, out-patient clinics and in the care of various health agencies. If

necessary, a one day census will be made in hospitals to classify patients and discover how many are suffering from incurable chronic diseases.

Dr Moroder, after holding several positions in the Ministry of Health of Chile was appointed Professor of Public Health at the School of Public Health of Santa Fe Argentina. In 1949 he was named Director of the School and remained in that post for several years. The appointment in Israel is not Dr Moroder's first with WHO: he spent two and a half years as statistician and programme analyst in the Regional Office for the Western Pacific, Manila, before undertaking his current assignment.

Singapore Nursing Project

Three nurses have been assigned to a WHO aided project in Singapore in which the Government is making an effort to improve nursing education and nursing services. Miss Yvonne Ludgate of England has been appointed nurse educator in general nursing. Miss M. Chalmers of Australia as senior nurse educator and Miss M. E. Hosking, of New Zealand as nurse educator in midwifery.

Environmental Sanitation Project in the Philippines

With WHO assistance the Government of the Philippines has initiated a programme designed to strengthen the present environmental sanitation services of the country. Mr Avner Goor, public health engineer, has been appointed by the Organization to act as technical and administrative adviser on environmental sanitation to the Department of Health. Mr Goor will also assist in the training of professional and sub-professional personnel in environmental sanitation and in the development of a long range plan in this aspect of public health for the whole country.

WHO Receives Voluntary Contribution from Brunei

Announcement has been made by the WHO Regional Office for the Western

Pacific that a voluntary contribution to the Organization of \$3256.25 has been received from the Government of Brunei. Brunei a Sultanate under the protection of the British

Crown made a similar donation last year which was accepted with thanks by the WHO Executive Board at its fifteenth session (January 1955)

Review of WHO Publications

Pharmacopoea Internationalis Editio Prima
Volumen II World Health Organization
Geneva 1955 xx + 350 pages Price
£1 15s \$6.75 or Sw fr 20 —

The International Pharmacopoeia has been prepared with a view to fulfilling the desire long felt by pharmacists and physicians throughout the world for the establishment of recommended international specifications and nomenclature for pharmaceutical preparations in general use. Volume I was published in English and French in 1951 and in Spanish in 1954.

Volume II is now available in English and in French and will soon appear in Spanish. This volume consists of 217 monographs, 26 appendices and 1 annex. It contains among others specifications for some of the pharmaceutical preparations introduced into therapeutics during the last decade (e.g. penicillin, chloramphenicol, dihydrostreptomycin, oxytetracycline) and for some synthetic substances of growing importance. It also comprises monographs on compressed tablets, sterile injections and tinctures of substances included in Volume I.

In the appendices are descriptions of the relevant methods of assay for some of the substances in the volume and as in the first volume a table giving the usual and maximal doses for adults of all the pharmaceutical preparations. In addition for certain drugs in both volumes there is a table of usual daily doses for children. Another appendix contains a list of the International Biological Standards and Reference Preparations at present available.

An annex on solutions of cardiolipin and lecithin has been added in view of the increasing use of these substances in serological tests.

The volume is provided with a detailed alphabetical index designed to cover both Volume I and Volume II.

Infant Nutrition in the Subtropics and Tropics
By O. B. Jelliffe Geneva 1955 (*World Health Organization Monograph Series* No. 29) 237 pages 24 illustrations
Price £1 5s \$5.00 or Sw fr 15 — (clothbound)

A lengthy pre-publication review of this monograph has already appeared in a previous number of the *Chronicle* (*Chron. Wld Hlth Org.* 1955 9 217).

Dried BCG Vaccine By Yoji Obayashi
Geneva 1955 (*World Health Organization Monograph Series* No. 28) 220 pages
57 figures 91 tables Price £1 5s \$5.00
or Sw fr 15 — (clothbound)

An article based on this monograph was published in *Chronicle of the World Health Organization* 1955 9 259.

Bulletin of the World Health Organization
1955 Volume 12 Number 6 (pages 877-1116)

This number of the *Bulletin* contains the following articles: Serological analysis of venoms and antivenoms by W. H. A. Schöttler. Serological study of yaws in Java by

Huan Ying Li & R Soebekti, and Cholera studies 4 Problems in immunology by R Pollitzer, & W Burrows In addition there is a bibliographical section covering plague, relapsing fever, and international sanitary conventions and regulations

Bulletin of the World Health Organization
1955, Volume 13 Number 1 (pages 1 208)

The first number of Volume 13 of the *Bulletin* is devoted to Cholera studies 5 Bacteriophage investigations by R Pollitzer Changes in the epidemiology of plague in Egypt 1899 1951, by Abdel Gawad

Hussein Statistical observations on death rates and causes of death in Korea by Chai Bin Park, and three articles which are covered in the present *Chronicle* Wild rodent flea control in rural areas of an enzootic plague region in Hawaii a preliminary investigation of methods by L Kartman & R P Lonergan (see page 287) World survey of typhoid and paratyphoid B phase types by A Felix (see page 280) and Typhoid and paratyphoid fevers from 1950 to 1954 a report prepared by the WHO Epidemiological and Morbidity Statistics Section (see page 283) It also contains a bibliographical section on typhus and related infections

CORRIGENDUM

Vol 9 No 6

POLIOMYELITIS IN 1953

Page 156 fig 1 legend

delete		cases	}	Canada (excluding Yukon and the North West Territories since 1950 including Newfoundland)
	—	deaths		
		cases	}	USA
	—	deaths		
insert		cases	}	Canada (excluding Yukon and the North West Territories since 1950 including Newfoundland)
	—	deaths		
		cases	}	USA
	—	deaths		

DRIED BCG VACCINE

YOJI OBA\ASHI

1955 220 pages 57 figures
91 tables

Price

£1 5s \$5 00 Sw fr 15 —
(Clothbound)

- 1 Cultivation and human inoculation tests
- 2 Cultivation test of BCG vaccine
- 3 Present method of production
- 4 Hand shaking method of BCG production with crystal or agate balls
- 5 Culture period of BCG on Sauton medium
- 6 Method of freeze-drying
- 7 Effect of freeze-drying on potency of BCG vaccine
- 8 Effect of storage on viability and potency of BCG vaccine with special reference to storage temperature
- 9 Effect of light on viability and potency of BCG vaccine
- 10 Effect of degree of vacuum on preservability of dried BCG vaccine
- 11 Effect of residual moisture on preservability of dried BCG vaccine
- 12 Viability and allergenic potency of mass produced dried BCG vaccine

INFANT NUTRITION IN THE SUBTROPICS AND TROPICS

D B JELLIFFE

1955 238 pages 24 figures
2 colour plates 8 tables

Price

£1 5s \$5 00 Sw fr 15 —
(Clothbound)

- 1 Evolution of infant feeding in the Western World
- 2 Present infant feeding practices in the subtropics and tropics
- 3 Present status of nutritional disease among infants in the subtropics and tropics
- 4 Methods of improving infant feeding in the subtropics and tropics
- 5 Prevention of kwashiorkor
- 6 Nutrition education in the maternal and child health (MCH) centre

WHO Publications Needed...

There is a demand for certain WHO publications which are now out of print. It would be greatly appreciated if those in possession of copies of these publications which they do not need would return such copies to the Organization. The following are sought:

Chronicle of the World Health Organization Vol 9 No 4 (April 1955) and these numbers in the *World Health Organization Technical Report Series*—

- No 10 Report on the first session of the Expert Committee on Environmental Sanitation
- No 16 Report on the first session of the Joint FAO/WHO Expert Committee on Nutrition
- No 22 Report on the first session of the Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel
- No 25 Report on the second session of the Expert Committee on Health Statistics
- No 44 Report on the second session of the Joint FAO/WHO Expert Committee on Nutrition
- No 53 Third report of the Expert Committee on Health Statistics
- No 59 First report of the Expert Committee on Trachoma

The publications should be addressed to: World Health Organization
Division of Editorial and Reference Services, Palais des Nations, Geneva
Switzerland



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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SCHEDULE OF MEETINGS

7-11 November	Study Group on Arteriosclerosis, Geneva
10-24 November	International Conference on Yaws Control Enugu Nigeria
15 November 3 December	Seminar on Public Health Administration Egypt and Soudan
17-26 November	Study Group on Basic Nursing Curriculum Brussels
23-26 November	Study Group on Leptospirosis, Amsterdam
28 November 2 December	Study Group on Tuberculosis Control Luxembourg
28 November 6 December	Second African Malaria Conference Ibadan Lagos Nigeria
5-9 December	Joint WHO/UN Advisory Group on Social and Medical Social Work, Amsterdam
6-15 December	Study Group on Filariasis Kuala Lumpur
12-17 December	Seminar on Environmental Sanitation Ibadan Nigeria
12-17 December	Expert Committee on Maternal and Child Health Administration Geneva

The mention of manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature which are not mentioned. Proprietary names of such products are distinguished by initial capital letters.

PROSPECTS OF INTERNATIONAL PUBLIC HEALTH CO OPERATION IN THE USES OF NUCLEAR ENERGY *

The problem of protection against radiation has today taken on a new aspect. In the past it was only radiologists and more recently personnel working in atomic energy installations who were exposed to radiation hazards. This is no longer the case. With the widespread use of nuclear energy whole populations run the risk of being affected by radiation. Although protection against this risk is certainly an important aspect of industrial hygiene it has now become also one of the general aspects of public health.

For this reason the World Health Organization felt that it would be opportune to submit two papers to the recent International Conference on the Peaceful Uses of Atomic Energy. The first was entitled "The General Problems of Protection against Radiations from the Public Health Point of View" and the second "Education and Training in Health and Medical Uses of Atomic Energy". These are to be published by the United Nations in the proceedings of the conference and may be referred to for further details. This material was intended to draw the attention of both national public health administrators and nuclear energy specialists to the extent and importance of the health problem which is inherent in the development of atomic energy.

EXTENT OF THE PROBLEM OF PROTECTION AGAINST RADIATION

While man has always been exposed to radiation from cosmic and other natural sources today's developments in nuclear

power will with the passage of time lead to an increase in background radiation level from radiation sources of man's own making if these are not controlled. From what is already known of the biological effect of radiation an intensification of the radiation background is likely to lead to genetic and possibly somatic effects in man. It is therefore on those who are responsible for public health that the obligation falls to do everything possible to prevent background radioactivity from increasing too rapidly and from attaining too high a level. This danger still very small already exists in the operation of nuclear energy plants and adequate protective measures are at present being adopted at the industrial level. As the use of nuclear power for industrial purposes extends however the problem will become a much wider one.

The present codes of practice for dealing with radioactive effluent from atomic energy plants are compiled on the supposition that an insignificant proportion of the world population is involved. As that proportion increases these codes may have to be made more exacting. The limiting factor in compiling standards is and is likely to remain for some time knowledge of human genetics a subject on which there are few relevant quantitative data. But time is short and public health must fulfil its obligation by intelligent control so that general exposure to radiation background will not soon reach levels from which there is no return.

This lack of adequate numerical data relating radioactive background to its effect on the world population opens the way to the two extreme courses of over-caution on the one hand or undue leniency on the other. Public health activities must be directed to

* A suggested programme for public health based on two papers (A Conf 8 P/778 and A Conf 8 P/779) submitted by WHO to the 1st International Conference on the Peaceful Uses of Atomic Energy.

making use of the experience gained in industries using nuclear energy during the last ten years, those responsible for public health must not lay themselves open to the accusation that they are hindering the development of nuclear energy and thus depriving the world of its benefits. On the contrary positive and constructive collaboration must begin at once between public health administrators and those who are responsible for the technical development of the new form of energy. The task will be lightened considerably by the provision of really adequate protection in new installations and for this reason public health should collaborate in the early design stage. It has been seen in the past how occupational health problems which were foreseen and attended to in good time were found to be less costly than those discovered too late.

At the present time the technical staff in nuclear energy installations are themselves largely dealing with the question of protection of neighbouring communities but as the installations increase in number the responsibility will fall to a much greater extent on public health authorities. Here again there must be agreement with the technical experts, for regulations if they are to be effective must be essentially practical.

SPECIFIC PROBLEMS AND RESPONSIBILITIES

Nuclear energy plants will impinge on public health by means of their waste products, and through the widespread distribution of radioactive isotopes. The practical public health problem will then be to assess and control the radioactive wastes and to ensure that the radioactive isotopes distributed are safely transported and disposed of. The wastes are of three kinds—gaseous liquid, and solid.

The air may be polluted from stacks which emit either radioactive particles or gases.

Particulate waste can be filtered and there is already much experience in this field. Some of the radioactive material emitted from stacks may be gaseous and can pass through any filter, but on the whole these are short lived. The use of filters and gas traps changes the air pollution problem to one of the disposal of solid contaminated waste. In this connexion public health services must be equipped to carry out air monitoring to be assured that conditions are safe in populated areas. The present safe disposal standards are contained in the Recommendations of the International Commission on Radiological Protection (1953).

Pollution of water by radioactive materials is also a problem. If waterways are used for the disposal of radioactive materials, small quantities of such waste are very liable to reach water which may be used for drinking or in which edible organisms are living. The standards for such pollution are also contained in the Recommendations of the International Commission on Radiological Protection and public health authorities must be in a position to verify them. It must be remembered that some biological systems have the power to concentrate certain radioactive elements so that a water monitoring programme must include the measuring of radioactivity in water edible organisms some of the lower forms of life and sediments.

At present much of the dilute wastes from atomic installations are dealt with by running them into the ground where the radioactive elements which are in small bulk are taken up and retained mostly by the clay. The practice of getting rid of wastes in this manner is economically desirable but care must be exercised in its execution especially as it may become widespread. The presence of large quantities of chemicals in the waste solution may destroy the soil's property of retaining the radioactive elements. Also the movements of these wastes are governed by the properties of the soil itself and the move-

ments of the ground water. A more conservative approach to ground disposal is the use of specially prepared beds so that the active soil is retained under control and the effluent from the beds monitored and disposed of to the ground if sufficiently decontaminated. The burial of contaminated solid material raises much the same problems as the release into the ground of contaminated solutions. The site must be chosen with the same considerations in mind.

A much bigger public health problem is the disposal of highly radioactive wastes. To date there is no good solution to this problem and many methods are being studied. In the meantime the wastes are stored in tanks awaiting permanent disposal. For countries which are crowded together and which lack space it may be desirable to have a common waste disposal site; also the possibility arises of having a few recognized sites throughout the world which would be considered safe for the deposit of high activity waste and which would be under international control.

A SUGGESTED PUBLIC HEALTH PROGRAMME

It now seems possible to suggest a programme of work which might logically be undertaken in public health along with the development of nuclear power.

Training of personnel

This is one of the immediate important requirements. The number of public health personnel trained in this specialized field is at present inadequate especially in countries which as yet have no nuclear energy programme. Moreover public health workers must be trained to such a level as to command the respect of their colleagues in physics, chemistry and engineering if their advice is to be heeded.

Training will have to be begun at the level of the medical student. Knowledge of the nature of radioactivity and its relationship with biology and medicine should be included in the preclinical courses and information concerning the use of radioactive substances in diagnosis and therapy in the clinical period with particular emphasis on the radiation protection aspect. In addition to prepare him for his future role in the community as a health educator the medical student should be introduced to such subjects as possible community effects of nuclear contamination.

In training doctors for specialization in the use of radio-isotopes for diagnosis, therapy and research emphasis should be placed on methods of safe handling and disposal of radioactive materials. Courses for the study of the medical uses of radio-isotopes or an apprenticeship in their use under actual working conditions are available only in certain countries and provision has often to be made for study abroad for those interested in this work. The World Health Organization has been able to award several fellowships along these lines.

With regard to the public health and preventive aspects of nuclear energy measures must be taken to instruct medical officers of health, public health engineers and other relevant personnel in the nature of ionizing radiations, their effect on the body and protection methods. The medical officer may eventually be called in to give advice on problems such as the disposal of radioactive wastes including the burial or cremation of bodies of patients treated with radio-isotopes. Alternatively he may have to take part in discussions on the siting of atomic power stations. Such instruction will probably devolve upon schools of public health or institutes of hygiene which should also offer refresher courses for those who have completed their training before these subjects were introduced into the curriculum. Those engaged in industrial health—physicians, en-

gineers, and nurses—have a special interest in nuclear energy and must be equipped to perform newly imposed functions

Consideration must also be given to the training of personnel for the new professions which are coming into existence with the increasing use of nuclear energy. There is need for staff who in North America and Britain are called health physicists—health workers equipped to handle, interpret and control this beneficial but at the same time potentially harmful force. Three levels of technical personnel of this type are often employed in the larger atomic energy installations: the radiation surveyor who performs the routine work and whose task is to detect and measure gross radioactivity and to appreciate radiation hazards; the supervisor or junior health physicist who is responsible for radiation control beyond the routine stage; and the specialist, or senior health physicist, who is charged with the broader aspects of radiation programmes including consultative functions with respect to design of facilities.

The largest group will be the technicians or radiation surveyors. Their training need not be extensive and may begin with in-service training in institutions where radioactive materials are utilized.

The supervisor should have training equivalent to a Master's degree generally based upon major work in physics, chemistry or engineering, perhaps with the final year concentrated upon atomic and nuclear physics, specialized biology as related to the nuclear field, and courses in electronics and related subjects. He should become proficient in dealing with radiation hazards, principles of measurement of ionizing radiations, measurements of radioactive isotopes as dust or gas in the air, decontamination of surfaces contaminated with radioactive isotopes, and similar subjects.

The specialist should have education equivalent to a doctorate and in addition a

knowledge of psychology and experience of an administrative nature. His training should be both formal and in service and cannot be fixed in terms of years.

The World Health Organization attaches particular importance to the question of training and has studied the means by which it could adapt its methods and its general programme of professional training to the requirements of this new discipline. By the award of study fellowships, by assistance to educational institutions, by demonstration projects, by sending visiting professors or by the exchange of scientific information, WHO could help governments at their request, to complete the training of relevant personnel.

WHO has made a limited survey of education and training activities in the health and medical uses of nuclear energy in a number of countries—Canada, France, the United Kingdom and the USA—and anticipates an extension of this survey.

During the recent Geneva Conference on the Peaceful Uses of Atomic Energy, informal talks showed the need for a health physics course for various European countries which were starting large scale atomic energy work for the first time. In this way some of the very considerable health physics experience which the United States in particular has accumulated in dealing with her atomic energy programme could be passed on to these other countries. WHO was able to make this possible by providing financial backing with fellowships and other means and is helping in the organization of a course which is to take place in Stockholm during November and December 1955. The course director and assistant director will come from the United States and there will be a lecturer from England and another from France. This is thought to be the first international course on health physics ever organized, and plans are being made for a further course in the future.

The dissemination of pertinent public health information

There is at present a vast body of knowledge concerning the radiological health problems associated with nuclear energy. For various reasons this knowledge is not available in a co-ordinated and condensed form. In order to remedy this situation it is necessary for the existing information to be co-ordinated and made available to those requiring it. The effort necessary to do this would be considerable and worthy of the attention of an international organization such as WHO. With the help of the experts in all parts of the world with whom the Organization maintains a network of communications it is proposed that a list be established of important public health questions which would then be submitted for the examination of groups of international authorities in the various branches of knowledge concerned. There would of course be close collaboration with existing national and international scientific institutions. Thus the Organization would in this field as in others be playing primarily the role of promoter and co-ordinator. WHO's publications could also help in the dissemination of information collected in this manner.

Research

The third aspect of the programme would be the promotion of a world wide scientific study of the somatic effects of low level radiation on human beings in relation to the

intensification of the radiation background. Although a great deal of work has been done on animals more human data obtained from, for instance patients submitted to radiation therapy or workers in the uranium mining industry would be most desirable.

The fourth point of the programme would be to encourage similar studies of radiation induced genetic effects in the human race. This is an extremely difficult problem and a clear method of attack is not evident but promising lines should be further discussed among representatives of the considerable number of different sciences involved. There is the possibility for instance that it would be practicable to measure the incidence of certain well worked out congenital conditions in areas of the earth with a relatively high natural background of radiation although this would have to be undertaken in countries with adequate demographic information. Another possibility would be to make a genetic study of the children of those whose gonads had been exposed to therapeutic irradiation.

Animal genetic research is of course always continuing but it remains to be seen how far the results obtained are applicable to man.

Whether the study be of human somatic or genetic effects opinion in WHO is that an essential element in many lines of research would be a uniformity of work methods and standards so that results might be comparable internationally.

Epidemiological and Vital Statistics Report

The most recent number of the *Epidemiological and Vital Statistics Report* (1955 Vol. 8 No. 9) is devoted to statistics on mortality from ulcers of the stomach and of the duodenum from pneumonia and from bronchitis to monthly data on smallpox cases and deaths in certain countries and territories in 1953-1954 and, in some instances, 1955 to cases of smallpox reported in various countries and territories since 1971 and to cases of trachoma reported in various countries and territories since 1945.

CLINICAL TRIALS OF ANTIRABIES SERUM

Even within recent years treatment by antirabies vaccine had been shown to be powerless to prevent the fatal outcome of rabies in an appreciable proportion of patients who had been bitten in the head by rabid animals particularly wolves.¹ The antibodies induced in the organism by the vaccine apparently formed too slowly to counteract the development of the virus introduced by a bite close to the nerve centres. A solution to this problem which was acute in certain countries where the risks of serious wounds were great was urgent.

The WHO Expert Committee on Rabies began to consider this problem in 1950. It recommended the study of certain prophylactic substances which had given encouraging results in the laboratory in particular of antirabies serum of high antibody level (hyperimmune serum). In addition it recommended that a field trial should be undertaken, as soon as conditions permitted to determine the practical value of this serum combined with vaccine in the treatment of rabies in man.

Iran was chosen as the country for the investigation. Attacks on villagers by rabid wolves were not infrequent there between 1936 and 1949. 325 persons bitten by rabid wolves—186 of them bitten in the head—had come to the Institut Pasteur in Teheran for treatment. Often there were series of cases as many as 40 persons having been bitten. From 1950 to 1954 however only isolated cases occurred and in spite of the success of combined serum vaccine treatment the results were too fragmentary to enable definite conclusions to be drawn.

But in August 1954 a rabid wolf suddenly appeared in a village in Iran and created a

dramatic situation which afforded an opportunity for a conclusive experiment. Dr M. Baltazard, Director of the Institut Pasteur of Iran (Teheran) who was in charge of this study has given an account of it which is soon to be published.

Dr Baltazard describes as follows the attack of the wolf.

During the night of 21-22 August 1954 at about 1 a.m. a large wolf penetrated into the sleeping village of Sahane situated on the international route which runs from Teheran to Baghdad and Damascus. Being half way between the towns of Hamadan and Kermanshah Sahane is a fairly frequented stopping place and on the night in question a dozen or so trucks and motor buses had halted there. The drivers and passengers were sleeping either inside the *ghavehkhanehs* (inns) or outside on account of the heat.

The wolf descending from the mountains approached Sahane from the north-east through the orchards and vineyards where there are no houses but where at that time of the year the guardians who keep watch on the fruit sleep. The animal made its way south jumping the low earth walls and spiky hedges and attacking 13 people one after the other. Most of them were lying down which explains why many of them were bitten in the head.

This attack on people in the orchards and vineyards went on for more than two hours. Cries were heard in all directions and in the midst of the confusion lanterns were lit and a hunt organized. In the meantime however the wolf had reached the village itself. One of its victims was a blind beggar who was sleeping in the street. It penetrated into the bazaar and attacked a person sleeping inside a house the door of which had been left open. From there the beast jumped into a courtyard and on to the terraces of the houses which are very low and attacked an old woman. At this point it disappeared, and it is not known whether it went first to the east where three people were attacked or to the west. At the end of the night it was on the main road itself to the west of Sahane where the lorries and motor buses were stationed in front of the darkened *ghavehkhanehs*. The animal bit three passengers and a driver.

¹ See article by Baltazard M. & Ghodssi M. (1954) *Bull. Wild Dis. Org.* 10: 797.

Baltazard M. & Bahmanyar M. (1955) *Bull. Wild Dis. Org.* 13 (in press).

TABLE I CLINICAL AND SEROLOGICAL RESULTS OF TREATMENT WITH ANTI-RABIES SERUM AND VACCINE

Series	Number of cases	Treatment	Number of deaths from rabies	Serological observations
	(4 series only)	Serum 1st and 3rd days Vaccine 21 days	0	Antibodies in all dogs first 5 days. Intermittent maintenance of titre to 21st day. Subsequent decline to 53rd day. Dogs kept with high level from 21st to 53rd day.
A	1 (erysipelas) (Fig 1)	Serum 1st, 3rd, 5th, 7th, 9th, 11th days Vaccine 21 days (Penicillin 100,000 units daily for 10 days)	0	High level of antibodies during whole period of observation.
B	7 (4 erysipelas)	Serum 1st day Vaccine 21 days (except 1 who died 16th day)	1	Antibodies during first 5 days. Low level in 4 subjects. In fatal case titres only after 21st day.
C	13 (1 erysipelas)	Vaccine 21 days	3	No antibodies before 19th day. Persistent in 3 subjects. In 21st and 22nd day (1 day). No antibodies in 2 cases. 1 fatal.

Serum obtained from the L. d. le. L. boratavies Pasteur Institute NY USA injected at the rate of 0.5 ml per kg of body weight (100 ml in the case of the dog). Vaccine prepared in sheep brain (phenol 0.6%) 5 ml daily by a cutaneous abdominal injection.

coupled with a dog, and then attacked a fruit merchant in his shop. It left the main road and passed behind the houses to the south of the village where it attacked a traveller resting in a garden and went on towards the south. The next victim was a policeman on his early morning rounds. By this time the wolf was exhausted and had hardly any strength left for attack. It nevertheless bit a group of six cows grazing in a field (three of these died of rabies and the other three were slaughtered). Its last victim was a horse on which a peasant armed with a mattock was mounted. The man jumped from his horse and killed the wolf with about ten blows of his mattock.

Emergency aid was given to the victims in the small local hospital and a few hours afterwards 27 persons (of the 29 bitten) were sent by truck to Teheran which they reached within 32 hours after they had been bitten. Two others arrived later, one of them about 100 hours after being bitten. Eleven of the victims were bitten in the trunk or limbs and 18 in the head. The treatment of the latter and the results of the treatment are summarized in table I.

There were no deaths among those bitten in the trunk or limbs whether they were given serum + vaccine or vaccine alone. These results confirmed observations made during the past thirteen years at the Institut Pasteur in Teheran that treatment of persons bitten in the trunk or limbs is very effective.

Of the subjects bitten in the head who received a single injection of serum, one out of seven died. The patient who was treated about 100 hours after the bite was among the survivors. There were no deaths among five serious cases which received two injections of serum. The most striking case was that of a boy six years old whose parietal bone had been smashed and the *dura mater* torn by the wolf's teeth but who in spite of this "intracranial inoculation" resisted the infection as a result of six injections of serum combined with vaccine treatment (see fig 1). Examination of these cases showed that the wolf's bites remained virulent from



Young boy very seriously bitten (see text) who did not contract the disease

the beginning to the end of the attack i.e. for about four hours. The virus was isolated from the brain of the wolf.

SEROLOGICAL STUDY

The clinical study of the cases treated with either vaccine alone or vaccine + serum was supplemented by serological examinations. From the beginning of treatment up to the 53rd day in some cases serological samples were taken at fixed intervals and subjected to the mouse neutralization test to ascertain their antibody level. The results of these tests carried out by Dr K. Habel and Dr H. Koprowski are also to be published³.

The authors sought to correlate the level of neutralizing antibodies present in the serum of the treated victims with the evolution of the disease. Table I gives a brief summary of their observations.

³Habel K. & Koprowski, H. (1955) *Bull. Wild. Hlth. Org.* 13 (in press)

The results indicate clearly that in the case of head bites the combined administration of serum and vaccine gives more effective protection than vaccine treatment alone. In general it appears that the passive antibodies introduced into the blood after the bite hold the infection in check until the antibodies produced by the vaccine come into action.

In discussing these results and the various biological processes involved the authors stress a number of points. Three sources of antibodies and the interaction of a number of factors must be considered in connexion with the immunological phenomena which develop from the beginning of treatment up to cure or death of the patient.

FIG 2 CLINICAL TRIALS OF ANTIRABIES SERUM



One of the survivors from series B

The passively administered antibodies introduced by injection of serum into the organism very quickly produce in the blood of the victim a certain level of protection low or intermediate depending upon the potency of the serum. This protection level tends gradually to decrease with excretion and destruction of the foreign serum. Side by side with these passive antibodies there are antigens in the blood the vaccine inoculated with the serum and possibly street virus introduced by the bite of the rabid animal. The body's defence will depend to some extent on the response to these antigens. Response to the vaccine generally appears between the 14th and the 21st days in the course of vaccine treatment. The potency of the vaccine and the patient's ability to produce antibody are limiting factors which may decide the outcome. In some cases there is hardly any reaction at all to the antigen

stimulus. This was so with regard to two of the patients in series C one of whom died, and with regard to the only fatal case in the B series.

As far as the antigen introduced by the bite is concerned there is no way of knowing—except in fatal cases—when the bite introduces a sufficient quantity of rabies virus for multiplication to begin the quantity of virus produced by multiplication or when multiplication ceases. It is probable that this antigen arouses a serological response which is as effective as if not more effective than that produced by the vaccine.

The interplay of these various factors makes it impossible to dissociate their effects and to determine the role played by each. For example it is not possible to distinguish after the 21st day the part of the antibody due to the vaccine and that of the antibody resulting from multiplication of the street virus.

Epidemiological and Vital Statistics

A recent number of the *Epidemiological and Vital Statistics Report* (Vol. 8 No. 8) contains statistical tables on a variety of subjects including natality and general mortality in a number of countries since 1951, infant mortality and neonatal mortality for the same period, and natural increase from 1951 to 1954, deaths from paralysis agitans (Parkinson's disease) in certain countries since the first available year which varies from country to country, and cases of and deaths from cholera, poliomyelitis, and influenza in various countries since 1953. This number also contains an addendum to the statistical information on deaths from epilepsy which was published in Vol. 8 No. 6.

A QUANTITATIVE STUDY OF MEDICAL SCHOOLS AND PHYSICIANS

As medical schools are the sole producers of physicians their activities viewed quantitatively are of interest and importance in assessing how adequately the health needs of populations in different parts of the world are met in terms of the number of physicians available. In addition if the annual number of graduates of these schools is taken into consideration some idea of the future medical coverage of the population can be gained. A recent statistical survey of medical schools and physicians published in the *Bulletin of the World Health Organization*¹ compares the number of medical schools and of physicians with the population served.

Table I summarizes the data presented in this study.

Space does not permit reproducing the tables for all of the regions but the two tables which follow are representative of the information presented and include many

of the countries with a long tradition in medical education.

These figures though they are in many cases incomplete or are simply estimates may be of value to health officials and other persons concerned with the over all planning of health and medical services.

The 595 medical schools are located in 85 countries with a wide range of populations served. The data show that nine countries have one medical school for less than 1 million inhabitants and that 13 have one medical school for 9.17 million of the population. Many millions of people live in countries in which there is no medical school.

There are more than a million physicians a figure to which must be added from 50 000 to 60 000 graduates of medical schools each year. But the distribution of these physicians in relation to the population of individual countries is most unequal. For example 14 countries have one doctor for less than 1000 inhabitants, whereas in

Troup n J L (1955) *Bull. Wld. Hlth. Org.* 13: 345

TABLE I POPULATIONS MEDICAL SCHOOLS AND PHYSICIANS BY CONTINENTAL AREAS

Area	Population	Number of medical schools	Population per medical school	Number of physicians	Population per physician	Annual number of medical graduates
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Africa	11 851 000	14	15 139 000	23 253	9 111	855
America North	233 872 000	122	1 917 000	247 290	946	8 830
America South	120 731 000	51	2 367 000	48 202	2 505	3 733
Asia Eastern	1 370 951 000	152	9 070 000	701 509	6 804	11 582
Asia Western	83 112 000	13	6 393 000	16 970	4 838	239
Europe	614 831 000	237	2 594 000	643 144	956	27 177
Oceania	13 910 000	6	318 000	12 083	1 151	753
	2 649 268 000	595	4 453 000	1 199 374	2 272	53 889

72 countries the ratio is one doctor to 20 000 or more of the population. However these figures do not take into account the fact that some of the doctors included are actually non practising that they are engaged in teaching research administration or similar activities. Other factors which cannot be taken into consideration in such an analysis are the socio-economic development of the country the distribution of doctors within the country and the auxiliary and ancillary health personnel available all of which are important.

Despite the limitations of this purely

quantitative study it serves to give a picture of the present situation and developments and to show where it is most necessary to increase the number of doctors by whatever means are feasible—importation increasing the capacity of existing medical schools or creating new ones or arranging for study abroad. Each of these solutions poses particular problems for the countries concerned and “those who are responsible for charting the course of medical education must strike a balance on the basis of a comprehensive study the nature of which is only hinted at here”.

TABLE II POPULATIONS MEDICAL SCHOOLS AND PHYSICIANS IN NORTH AND CENTRAL AMERICA

Country (1)	Population (2)	Number of medical schools (3)	Population per medical school (4)	Number of physicians (5)	Population per physician (6)	Average number of medical graduates (7)
Panama	863 000	1	863 000	238	3 676	20
Nicaragua	1 000 000	1	1 000 000	570	2 312	18
Costa Rica	15 216 000	12	1 270 000	15 430	923	171
Jamaica	1 458 000	1	1 458 000	22	6 615	30
Honduras	1 664 000	1	1 664 000	777	6 741	10
Ecuador	25 830 000	16	1 613 000	11 22	2 504	600
USA	62 010 000	84	1 934 000	270 431	777	1 220
Salvador	1 770 000	1	2 122 000	32	6 322	11
Puerto Rico	2 279 000	1	2 279 000	1 012	2 253	40
Dominican Republic	2 347 000	1	2 347 000	764	3 071	66
Guatemala	3 043 000	1	3 043 000	437	6 135	25
Haiti	3 227 000	1	3 227 000	300	10 756	33
Cuba	5 807 000	1	5 807 000	5 600	1 037	100
UK Territory of the Virgin Islands	76 000	—	—	409	3 731	—
Cuba	91 000	—	—	313	2 862	—
Falkland Islands	14 000	—	—	134	4 067	—
Northern Atlantic	178 000	—	—	120	1 483	—
Greenland	75 000	—	—	18	1 389	—
	73 672 000	22	1 917 000	47 220	9.6	8 930

Estimated

A QUANTITATIVE STUDY OF MEDICAL SCHOOLS AND PHYSICIANS

As medical schools are the sole producers of physicians their activities viewed quantitatively are of interest and importance in assessing how adequately the health needs of populations in different parts of the world are met in terms of the number of physicians available. In addition if the annual number of graduates of these schools is taken into consideration some idea of the future medical coverage of the population can be gained. A recent statistical survey of medical schools and physicians published in the *Bulletin of the World Health Organization*¹ compares the number of medical schools and of physicians with the population served.

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TABLE I. POPULATIONS, MEDICAL SCHOOLS AND PHYSICIANS BY CONTINENTAL AREAS

Area (1)	Population (2)	Number of medical schools (3)	Population per medical school (4)	Number of physicians (5)	Population per physician (6)	Annual number of medical graduates (7)
Africa	211 851 000	14	15 132 000	23 253	9 111	855
America North	233 872 000	122	1 917 000	247 220	946	8 900
America South	1 073 100 000	51	2 367 000	48 209	2 505	3 733
Asia Eastern	1 370 961 000	159	9 070 000	201 509	6 804	11 589
Asia Western	23 112 000	13	6 333 000	16 970	4 898	859
Europe	614 831 000	237	2 594 000	643 144	956	27 177
Oceania	13 910 000	6	2 318 000	12 083	1 151	753
	2 649 268 000	595	4 453 000	1 199 374	2 900	53 889

Reports of Expert Groups

MEAT HYGIENE

The present world scarcity of protein foods emphasizes the importance of making the most of the meat supplies which are available and of ensuring that the meat is safe for human consumption. Even in countries where the level of hygiene is relatively high more than half of the epidemic illnesses due to food are caused by meat especially by processed meat.

A WHO/FAO joint committee of experts composed of medical officers, hygienists and veterinarians studied a number of problems relating to meat hygiene in particular means for improving slaughtering techniques in respect of meat and laboratory control. In its first report¹ this committee puts forward a number of recommendations which could be implemented both in economically developed and in less developed countries.

The pathogenic agents found in meat are the result of either a primary infection present in the carcass of the animal or a secondary infection due to human or environmental contamination. The agents in question are micro organisms such as *Salmonella* *sp.* parasites such as *Trichinella spiralis* or the products of living micro organisms (e.g. staphylococcal enterotoxin). Brucellosis, botulism, gastro enteritis, salmonellosis, shigellosis and tuberculosis are among the main diseases for which these pathogenic agents are responsible.

Some meat borne diseases create serious public health problems. Mild forms of bacterial anthrax for example cannot be diagnosed by clinical examination alone and the laboratory has not yet provided reliable diagnostic criteria. In regions where cysticercosis is highly enzootic the methods of inspection so far adopted (additional cuts in the diaphragm and shoulder muscles) are

still inadequate as they may allow infested carcasses to be passed over. When dogs are allowed to penetrate into abattoir premises (which happens particularly in rural areas) and when the organs which carry hydatid cysts are not burned or sterilized the spread of hydatidosis is assured. Finally with regard to trichinosis although there are effective methods of controlling the disease there are as yet no reliable and easy tests for detecting infestation in live pigs.

In order to determine with certainty the etiology of a food borne disease all the bacteriological and epidemiological factors present must be thoroughly studied. It is not sufficient for example to know that there are large numbers of staphylococci in a sample, one should know whether they are coagulase positive, what their phage type is and whether they are toxicogenic. In addition a typical clinical syndrome is observed in man. In all epidemic outbreaks of food poisoning it is essential to attempt isolation of the micro organism in both the patient and the suspected food.

The risk of "accumulation" of pathogenic micro organisms of intestinal origin introduced by germ-carriers—men or animals—is considerable in slaughterhouses and for this reason it is essential that the structural and sanitary arrangements of such establishments should be up to the necessary standard. It is recommended in the report that a small technical committee be set up to work out detailed plans for standard abattoirs.

In countries where infectious diseases such as typhoid and paratyphoid fevers and shigellosis are prevalent the risk of spreading infection by the handling of meat might be reduced very considerably if workers were kept permanently on given tasks and subjected regularly to clinical and bacteriological examination. This is frequently not possible.

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and Spanish

TABLE III POPULATIONS MEDICAL SCHOOLS AND PHYSICIANS IN EUROPE

Country	Population	Number of medical schools	Population per medical school	Number of physicians	Population per physician	Annual number of medical graduates
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Iceland	150 000	1	150 000	181	809	20
Malta	370 000	1	370 000	6	1 119	37
Ireland	2 933 000	5	587 000	2 921	1 004	728
Saar	976 000	1	976 000	711	1 373	50
Switzerland	4 939 000	5	988 000	492	999	374
Norway	3 359 000	2	1 680 000	3 506	958	100
France	42 882 000	24	1 787 000	37 432	1 146	2 200
Sweden	7 212 000	4	1 803 000	5 230	1 39	95
United Kingdom	51 043 000	27	1 890 000	44 510	1 145	2 400
Finland	4 192 000	2	2 096 000	2 129	1 969	150
Netherlands	10 609 000	5	2 122 000	9 000	1 179	600
Denmark	4 407 000	2	2 204 000	4 970	974	300
Belgium and Luxembourg	9 082 000	4	2 270 000	8 971	1 012	48
Italy	48 447 000	21	2 307 000	57 610	841	3 200
Austria	6 954 000	3	2 316 000	10 771	646	549
Hungary	9 600 000	4	2 400 000	11 400	849	160
Poland	26 500 000	10	2 650 000	14 183	1 868	600
Germany Federal Republic	51 749 000	18	2 875 000	68 135	760	3 300
Spain	28 756 000	10	2 876 000	28 412	1 012	1 000
Portugal	8 673 000	3	2 891 000	6 249	1 391	70
Romania	16 400 000	5	3 280 000	12 500	1 370	300
Germany Democratic Republic	20 000 000	6	3 333 000	12 000	1 667	300
USSR	207 000 000	61	3 393 000	273 000	758	8 000
Yugoslavia	17 788 000	5	3 558 000	5 138	3 165	1 06
Czechoslovakia	14 429 000	4	3 607 000	9 917	1 455	400*
Bulgaria	7 450 000	2	3 725 000	1 800	4 139	80
Greece	7 819 000	2	3 910 000	7 300	1 071	700
Albania	1 250 000	—	—	100	12 500	—
Trieste	297 000	—	—	200*	1 485	—
	614 831 000	237	2 594 000	643 144	956	27 177

Estimated

Notes and News

African Seminar on Environmental Sanitation

The WHO Regional Office for Africa is organizing a seminar on environmental sanitation to be held at Ibadan Nigeria from 12 to 17 December 1955. Most of the countries of the Region have been invited to send representatives who will include medical personnel at the policy making level and engineers from public works and municipal departments. Other agencies such as the Commission for Technical Co-operation in Africa South of the Sahara (CCTA) have been invited to send observers.

The general purpose of the seminar is to bring together professional leaders who are engaged in Africa in various aspects of environmental control and to stimulate the team approach in the administration and execution of sanitation programmes. The subjects to be discussed are (1) the principles of environmental control and its relationship to public health (2) some epidemiological relationships of sanitation (3) the sanitary evolution of a developing country and (4) ways and means of carrying out environmental sanitation programmes. It is hoped that the discussions will throw light on the real scope and potentialities of environmental sanitation and on the important role which engineers can play in partnership with medical officers of health in the planning and execution of sanitation programmes.

Two consultants are assisting the Regional Office in preparing for the seminar. Dr John A. Logan, Professor of Sanitary Engineering and Head of the Department of Civil Engineering, Northwestern University, Illinois, USA, and Mr Walter Sanches, Assistant Superintendent, Serviço Especial de Saúde Pública, Rio de Janeiro, Brazil. They will be joined at the seminar by two temporary advisers who will assist as discussion leaders: Médecin Général M. A. Vauzel, Inspecteur Général des Instituts Pasteur d'Outre Mer,

Paris, France, and Mr Peter C. G. Isaac, Lecturer in Public Health Engineering, University of Durham, Newcastle upon Tyne, England. The WHO Regional Office for the Eastern Mediterranean will be represented by its adviser on environmental sanitation, Mr John O. Buxell.

Regional Committee for Africa

The fifth session of the Regional Committee for Africa was held from 19 to 24 September 1955 in Tananarive, Madagascar. Chairman of the session was Médecin Colonel Pierre M. Bernard of the Direction du Service de Santé de la France d'Outre Mer. Dr G. J. Janz, Professor at the Institute for Tropical Medicine at Lisbon, Portugal, was Vice Chairman.

As at the other regional committee meetings, the chief items on the agenda were the annual report of the Regional Director on the activities of the past year and the programme and budget for 1956 and for 1957, all of which were approved by the Committee. The programmes for the next two years are expected to be financed approximately as follows: combined WHO regular budget and funds from United Nations Technical Assistance—1956 US \$1 196 000, 1957 \$1 360 000; UNICEF—1956 \$1 825 000, 1957 \$3 388 500.

Emphasis was laid in Africa, as in the other regions, on plans for the eradication of malaria.

Technical discussions held as part of the Committee's meetings dealt with the health problems of the pre-school age child in Africa and the role of the nurse in solving these problems. The child in Madagascar occupies a privileged social position and is relatively better cared for, but as elsewhere in Africa, infants are often looked after by older children. The discussions stressed the importance of training African public health

however and it is much more preferable to encourage the practice of careful personal hygiene on the part of food handlers

Although the principles of meat hygiene may be the same in all countries the question of establishing standards which could be applied in different communities raises certain difficulties. There are listed in the report certain measures which are absolutely indispensable if meat supplies are to be safe

(1) examination of the animal before slaughter to assure the elimination of unfit animals

(2) examination of the carcass and parts of carcass immediately after slaughter to separate for human food the normal wholesome product from diseased or otherwise unfit material

(3) removal and destruction of all diseased and otherwise unfit materials to assure their elimination from the food supply

(4) separation from edible products of all unfit materials in a way that will avoid contamination of the edible products by the unfit materials

(5) adoption of such environmental sanitation controls as will ensure against the contamination of edible products

(6) prohibition against the addition of harmful materials in the handling and preparation of the edible products

Notification of cases of food poisoning and food borne diseases should be made compulsory. However, although notification would provide some idea of the incidence of such diseases the public health physician—if he is to take appropriate steps—needs to know which are the pathogenic agents most frequently responsible and which the incriminated foods. Only systematic surveys in each separate case will provide him with this essential information. The medical practitioner the patient and his immediate contacts those who have handled the food—all must be interrogated. The analysis laboratories should issue instructions as to the nature of the samples to be taken and the manner in which they should be transported

The energetic application of general hygiene measures stimulated by consumer demand will assist public health authorities greatly in improving meat hygiene and in reducing unnecessary losses in meat

Regional Committee for the Americas

The eighth meeting of the Directing Council of the Pan American Sanitary Organization which is composed of delegates from the 21 American Republics and representatives of 3 European governments was held in Washington D C from 9 to 21 September 1955 under the chairmanship of Dr Hector A Coll Director General de Medicina Sanitaria of Argentina. This meeting was at the same time the seventh session of the WHO Regional Committee for the Americas.

The Council unanimously approved the report on the work of the Pan American Sanitary Bureau which acts as WHO Regional Office for the Americas. In 1954 the Bureau collaborated with the administrations of 27 countries and territories in carrying out 77 national health programmes, 30 inter-country and continent wide programmes and 6 inter-regional projects which form a part of WHO health programmes conducted throughout the world. The Bureau's efforts were directed particularly towards the control and eradication of communicable diseases, the coordination of all public health services, the strengthening of health administrations so as to make them gradually less dependent on international assistance and the training of health personnel.

The Bureau has established in Mexico City a co-ordination office for the malaria eradication programme in the Western hemisphere. The reports of governments on progress in malaria control confirm the need to carry out a large scale campaign against anopheline vectors of the disease before these vectors acquire resistance to residual insecticides.

The programme of work for 1956 comprising 130 projects in all includes campaigns for the eradication of yaws (this is in the final stages in Haiti), smallpox, venereal diseases and the *Aedes aegypti* mosquito, urban vector of yellow fever, programmes in tuberculosis control, environmental sanitation, public health nursing, maternal and child health, nutrition and the education and

training of health personnel, the award of 300 fellowships and the organization of several seminars to facilitate the exchange of views among health officials from various countries.

The Council approved this programme which will be financed by a budget of US \$2 200 000; there will also be available about \$1 180 000 already allocated to the Region by WHO for 1956 and other funds, notably from United Nations Technical Assistance funds and from UNICEF.

After having studied the proposed programme and budget for 1957 the Council recommended that WHO make provision for a budget of approximately \$1 300 000 for the Region of the Americas. This proposal will be submitted for the consideration of the Ninth World Health Assembly.

To enable the PASB to draw up programmes for long term inter-country activities corresponding to the needs of several or all of the countries of the Region, the Council requested those governments that had not yet done so to draft public health programmes and budget estimates for the years 1957-60.

Discussion of long range programmes for the control of communicable diseases revealed a definite tendency towards eradication campaigns; a number of representatives stressed that eradication where possible is the only logical public health approach.

This year the technical discussions were devoted to two topics: "Methods of Improving the Education of Public Health Personnel" and "Medical Care in Rural Areas".

The next meeting of the Directing Council will take place in the autumn of 1956 in Guatemala.

Regional Committee for South East Asia

The eighth session of the WHO Regional Committee for South East Asia was held from 5 to 10 September 1955 in Bandung, Indonesia. Dr Saiful Anwar of Indonesia was Chairman and Dr Sombun Phong Aksara of Thailand was Vice Chairman.

visitors who could win the confidence of the people and give instruction in child care and of establishing health centres where mothercraft could be taught

It was decided that the subject of next year's technical discussions would be practical means of tuberculosis control in Africa a problem of considerable importance in the Region

The next session of the Regional Committee will be held at Luanda Angola from 24 to 29 September 1956

Survey of Paediatric Education in Latin America

The Pan American Sanitary Bureau which acts as WHO Regional Office for the Americas is conducting a survey of paediatric education in Latin America similar to surveys which have been carried out in the USA Canada Western Europe Australia and New Zealand The Latin American survey covering 21 countries and approximately 75 schools is under the general direction of Dr Myron E Wegman Chief of the Division of Education and Training of the Bureau and formerly Professor of Paediatrics at Louisiana State University Dr James G Hughes Professor of Paediatrics at the University of Tennessee is acting as special consultant for this programme and is visiting a large number of schools

Endorsement of the programme has been given by the International Paediatric Association and the American Academy of Paediatrics whose country chairmen and secretaries are collaborating in the gathering of information

Seminars in the Americas

Sanitary engineering

The Pan American Sanitary Bureau is sponsoring a seminar on sanitary engineering for engineers from Mexico Haiti the Dominican Republic, Cuba, and other countries in the Caribbean, to be held in Puerto Rico early in November 1955

International Sanitary Regulations

A seminar on the International Sanitary Regulations, sponsored jointly by the Pan American Sanitary Bureau and the Government of Costa Rica was held in San Jose from 22 to 26 August 1955 It was attended by health officials from Costa Rica Cuba, Guatemala Haiti Honduras Mexico Nicaragua Panama and the USA

The seminar afforded the participants an opportunity to discuss the application of the International Sanitary Regulations to study the amendments approved by the Eighth World Health Assembly, and to establish procedures for reporting cases of quarantinable and other communicable diseases It was of particular interest in marking the first general discussion of the revised Regulations adopted by WHO in 1954

Latin American Centre for Classification of Diseases

Formal announcement has been made of the establishment of the Latin American Centre for the Classification of Diseases The Centre is located in Caracas Venezuela in the Ministry of Health and Social Welfare and is under the immediate direction of Dr Dario Curiel Chief of the Division of Epidemiology and Vital Statistics It is operating under the joint sponsorship of the Government of Venezuela and the World Health Organization

This centre follows the pattern laid down by the WHO Centre for the Classification of Diseases which was established by WHO in 1951 in London attached to the General Register Office of England and Wales The value of the first centre in solving problems of general interest in the classification of diseases pointed to the desirability of establishing a similar one in the Americas considering especially the problems in the Spanish speaking countries and the use of the Spanish version of the International Classification of Diseases Injuries and Causes of Death A training course on the coding of causes of death was held at the Latin American Centre in mid September 1955

Problems of malaria eradication

With regard to malaria the Regional Committee considered the implications of the fact that some species of anophelines are known to be developing resistance (both behaviouristic and physiological) to DDT where this insecticide has been used uninterruptedly for a number of years.

The delegates concurred fully in the views on the need for malaria eradication which were expressed by the Eighth World Health Assembly. They felt that governments in South East Asia should make every effort to accelerate the pace and to widen the scope of their anti-malaria operations taking eradication of the disease as the ultimate objective to be achieved as soon as possible. However it was pointed out that in many countries of this Region tremendous practical obstacles would first have to be overcome—e.g. difficulties in communications and transport and lack of facilities in rural areas for adequate diagnosis and for maintaining control when malaria transmission had been effectively interrupted.

The delegates were assured that both WHO and UNICEF in collaboration with other agencies such as the US International Co-operation Administration would render all possible assistance to national health services in tackling these urgent problems. For additional assistance from WHO a number of specific proposals were adopted and are to be carried out under the special Malaria Eradication Fund which was established by the Eighth World Health Assembly.

Tuberculosis in South East Asia

The two-day technical discussions reviewing anti-tuberculosis measures now being carried out in the countries of South East Asia were presided over by Dr P. V. Benjamin, Tuberculosis Adviser to the Government of India. Among the recommendations which emerged from the discussions and which will be circulated to health services throughout the Region were the following: (1) that carefully planned surveys should be carried out on a national scale in order to determine

the extent and the location of infective tuberculosis (2) that the domiciliary treatment of tuberculosis should be encouraged whenever such treatment can be based on tuberculosis centres providing facilities for proper supervision and control (3) that simply constructed institutions should be made available in all communities as a means of dealing with infectious cases which cannot be effectively isolated in the home and (4) that scientific investigations should be undertaken with a view to ascertaining whether the newer anti-tuberculosis drugs can in fact be used effectively on a mass scale for tuberculosis control.

Forthcoming sessions

The Regional Committee decided to hold its ninth session at the seat of the Regional Office in New Delhi and its tenth session in 1957 in Burma. It was agreed that in 1956 the technical discussions would be devoted to health education of the public—a subject considered to be of greatest importance in South East Asia.

Regional Committee for Europe

The fifth regular session of the Regional Committee for Europe which brought together representatives of 21 countries was held from 5 to 8 September 1955 in Vienna under the chairmanship of Dr A. Kham (Austria).

The Committee noted with satisfaction the progress made in the implementation of WHO's European health programmes during the first half of 1955. In addition to separate assistance given to a number of Member States of the Region about twenty courses, seminars, study groups and surveys were organized by the Regional Office or with its help. These included a symposium on the education of sanitary engineers², a seminar on mental health through public health practice³, a course on the treatment of acute forms of poliomyelitis⁴ and a meeting on veterinary public health.

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The meeting brought together delegates from Afghanistan Burma Ceylon India Indonesia Nepal Portugal, and Thailand Representatives of the United Nations, the United Nations Technical Assistance Board UNICEF the Food and Agriculture Organization, and UNESCO participated Observers for a number of intergovernmental and non governmental organizations in official relationship with WHO as well as observers for the US International Co operation Administration (formerly the Foreign Operations Administration) were also present

Main agenda items

The most important items on the agenda during the six day session were WHO's programme and budget for 1957 in the Region and a number of questions relating to national programmes against communicable diseases such as malaria and tuberculosis The annual report of the Regional Director was discussed in detail and approved

Separate technical discussions on tuberculosis filled two entire days of the meeting Problems of environmental sanitation health education of the public and the training of auxiliary health workers also received heavy emphasis in this year's session continuing a trend which has become more pronounced with each meeting of the Committee for the past several years

Programme and budget for 1957

The 1957 programme as agreed upon by the Regional Committee after detailed scrutiny on a country by country basis calls for an expenditure in South East Asia totalling about US \$1 400 000 under the WHO Regular Budget In addition an outlay amounting to approximately US \$4 500 000 is envisaged for WHO assisted projects in the Region which would be financed (apart from sizable investments by the governments themselves) from funds expected to be available under the UN Technical Assistance Programme and from UNICEF

Following approval by the Regional Committee the proposed programme and budget for 1957 for South East Asia will be co

ordinated at Headquarters with proposals made by the other five regional committees and will then be submitted by the Director General to the Ninth World Health Assembly which is scheduled to meet next May in Geneva

The Organization's plan of work in South East Asia for 1957 based upon specific requests put forward by the Member States of the Region, is designed primarily to strengthen further the various national health services Comprising some 150 separate but largely interrelated projects the programme shows major emphasis on assistance by WHO to the Member States (in many cases with substantial amounts of supplies and equipment from UNICEF) in the training of personnel and in other basic fields such as health education of the public and environmental sanitation

Training of health workers

Delegates were unanimous in the view that among the most critical problems facing health services practically everywhere in South East Asia is the acute shortage of physicians nurses and other health workers of all types It was pointed out that owing to the lack of facilities for medical education an adequate number of doctors would not be available in most countries of the Region for at least another twenty to thirty years The only possibility of building up the health services rapidly was therefore to train in large numbers auxiliary and paramedical personnel equipped to perform certain essential tasks (under the supervision of qualified medical practitioners) particularly in respect of health education maternal and child health and elementary medical care

In view of this situation special interest was manifested in a new plan for the large scale training of "sub professional" health personnel which was outlined before the Committee by Dr J Leimena Indonesia's Minister of Health Under the new scheme developed for his country Dr Leimena explained it was hoped that over a period of ten years about 200 000 low level workers could be trained

participants will present statements on the organization and development of the health services of their respective countries a general discussion dealing especially with the staffing of health services and the meaning of community development in relation to health will follow. After this general session the group will visit Egypt and Sudan at the invitation of the Governments of these countries to see some of the health establishments in each country.

With the help of the Regional Office the Government of Egypt and the Government of Sudan have prepared a special seven day programme for the group including visits to national and local health institutions. In Egypt the group will visit the departments of endemic diseases control and social health, the health organization in the Fayoum, and the Qalyub demonstration and training centre in Sudan they will visit medical and public health schools and welfare centres in Khartoum and Omdurman and the public health services of the Blue Nile Province.

At the conclusion of the visit to each country a discussion session is planned at which the group and national health authorities in the host government will have an opportunity to exchange views.

Professor A Stampar, President of the Yugoslav Academy of Sciences and Arts and Sir Andrew Davidson, former Chief Medical Officer of Scotland, have been invited to serve as special consultants to the group in leading the discussions.

Three travelling study groups of a similar nature were organized by the Regional Office for Europe between 1951 and 1954 and the participants all considered this a most useful means of promoting understanding and progress in public health administration.

Plans for Malaria Eradication in Eastern Mediterranean and European Regions

Dr P. F. Russell has been sent by WHO to help formulate a strategy to eradicate malaria from the countries between the Aegean Sea and the Persian Gulf. He is visiting Iran,

Iraq, Jordan, Syria, Lebanon and Turkey. He is accompanied by the Regional Malaria Adviser for the Eastern Mediterranean Region.

Another outstanding malariologist, Sir Gordon Covell, has gone to Ethiopia where he will study the prevalence and distribution of malaria and assist the Government in drawing up control plans.

Leprosy Control in Iraq

Early in September 1955 WHO appointed Dr M. Dalgamouni, Egyptian specialist in leprosy, as consultant to the Government of Iraq to survey the leprosy problem in that country and make appropriate recommendations for its control.

Regional Committee for the Eastern Mediterranean Sub-committee A

The session which Sub-Committee A of the Regional Committee for the Eastern Mediterranean held from 27 to 30 September 1955 in Beirut was attended by representatives of ten Member States of the Region: one Associate Member⁷ and three European countries responsible for the administration of a number of territories attached to the Region.⁸ Dr Jamil Anouti (Lebanon) was Chairman.

Reviewing the work done by the WHO Regional Office from 1 August 1954 to 31 July 1955 the Sub-Committee noted that at the present time 62 projects are in progress and that 32 others will be put into operation before the end of 1955. Of these projects 47% concern the control of communicable diseases such as malaria, tuberculosis, venereal diseases and the endemo-epidemic diseases bilharziasis in particular. 17% public health administration, 14% nursing, 8% maternal and child health, and 6% environmental sanitation. In addition during the period under review 117 fellowships were

⁷ Egypt, Ethiopia, Iran, Iraq, Lebanon, Libya, Pakistan, Sudan, Syria, Tunisia, Turkey, Yugoslavia.
⁸ Sudan, which was an Associate Member of WHO by virtue of resolution adopted by the Eighth World Health Assembly.
⁹ France, Italy, the United Kingdom, the Netherlands, and Northern Ireland.

No amendment was made to the program for assistance to countries in 1956 and the proposals for 1957 concerning this part of the programme were adopted without alteration. This means that WHO will continue to collaborate in the control of trachoma and other communicable eye diseases⁵ in Morocco, Spain, Tunisia, Turkey, and Yugoslavia (the number of persons suffering from such eye diseases in the countries of the European Region is estimated to be at least 8 millions); control of diphtheria in Austria; development of rural health in Greece; and the training of sanitary engineers in Portugal. The Organization will also continue to grant fellowships, under a programme in which more than two thousand fellowships for study and research have already been awarded.

New projects include the following: development of work already begun in the field of chronic degenerative diseases which constitute public health problems in Europe (e.g. diabetes, cancer, rheumatism, and cardiovascular diseases); prevention of accidents; study of certain mental health problems not yet sufficiently explored such as medical aspects of delinquency and the mental health aspects of great disasters and protection of workers and the general population against ionizing radiations.

The Regional Committee, being required to establish the guiding principles for the WHO programme in Europe for a further period of four years (1957-60), expressed the opinion that inter-country programmes were the most appropriate method in Europe of assisting governments to strengthen their health services. It was decided that the chief aims during this period would be study of health problems common to the countries of the Region; exchange of experience and development of services for the training of medical and health personnel. WHO should also continue to bring together different professional disciplines with joint responsibility in any health field, particularly where a tendency exists for such disciplines to work in isolation from one another. For example,

the control of diseases of animals which are transmissible to man would be facilitated in a number of countries by closer liaison between physicians and veterinarians.

Examining the malaria situation in Europe, the Committee recognized that co-operation between governments was a prerequisite for the success of the world campaign for the eradication of this disease which is to be undertaken in accordance with the decision of the Eighth World Health Assembly. Consultations among the countries of south-eastern Europe are now proceeding in preparation for an inter-regional conference on malaria to be held in Athens next year.

The theme of the technical discussions at this session was the question of the changes in health services necessitated by the ageing of the population. The discussions at the next session will have as subject the prevention of accidents in the home.

The Committee took note of the conclusion of a host agreement between the Government of Denmark and WHO and of the fact that it is anticipated that the Regional Office will be installed in Copenhagen in April 1957.

The next session of the Committee will be held in the autumn of 1956 in Rabat.

Seminar on Public Health Administration

To facilitate the exchange of knowledge and experience on the various problems of public health administration and to promote mutual understanding of and interest in some of the common public health problems in the Region, the Regional Office for the Eastern Mediterranean has arranged for a seminar on public health administration to take place in November 1955. Each government in the Region has been requested to designate a senior public health officer occupying a responsible position in the national health administration to participate in the seminar and fourteen governments have complied with this request.

The seminar, which will cover a period of nineteen days beginning on 15 November 1955, will include a general session at the Regional Office in Alexandria where the

⁵ *Chron. Wild Dis. Org.* 1955, 9, 266

of health personnel. Health administrations of the Region with encouragement from WHO have also begun to give increasing attention to diseases such as filariasis, arthropod-borne virus diseases and poliomyelitis. Mental health and dental health have also received increasing interest and have been made the subject of programmes which have been planned. Eighty-seven fellowships were awarded during the period under review.

Pursuant to recommendations put forward by the Second Asian Malaria Conference⁹ and to the resolution of the Eighth World Health Assembly inviting governments to undertake malaria eradication campaigns as soon as possible¹⁰ the Committee adopted a programme destined to accelerate campaigns to eradicate malaria. This programme involves (1) exchange of information and provision of the relevant technical data to Member States; (2) organization of malaria conferences, study groups and meetings of chiefs of malaria services; (3) supply of malaria advisory teams on request; (4) advisory services of highly experienced

malariologists of international reputation and (5) provision of training facilities through fellowships, study tours and malaria courses.

The Committee also adopted resolutions concerning environmental sanitation, the general programme of work for the period 1957-60, relations with UNICEF, public information activities, legislative developments in the expanded programme of technical assistance, campaigns against smallpox, guiding principles concerning projects to be financed under the regular budget and long-term planning of health programmes.

By unanimous vote the Committee decided to propose to the Executive Board that Dr I. C. Fang continue as Regional Director for the Western Pacific for an additional period of five years beginning 1 July 1956.

The subject of the technical discussions this year was domestic midwifery as an approach to the people in the development of rural health services. Next year's discussions will deal with the approach to and management of the pre-school age child.

The Committee will hold its seventh session in September 1956 in Manila. It accepted the invitation of the United Kingdom and Hong Kong governments to hold its eighth session in Hong Kong in 1957.

See Ch. 1, Wld Hlth Org. 1955, 9, 53.
See Ch. 1, Wld Hlth Org. 1955, 9, 197.

awarded to candidates desiring to undertake medical paramedical and nursing studies.

As a result of investigations made by WHO into the etiology of bilharziasis in the Region new molluscicides have been tried among these, sodium pentachlorophenate has been found to be an improvement on copper sulfate. An inter regional refresher course on bilharziasis and its prevention will probably be organized in 1957 in Cairo.

Seven tuberculosis control training and demonstration centres are functioning in Egypt, Iran, Iraq, Israel, Lebanon, Pakistan, and Syria and 14 BCG vaccination campaigns have been undertaken, with the technical guidance of WHO and financial assistance from UNICEF. The tuberculosis control dispensaries in the Region are being used increasingly as post cure centres which is a very encouraging sign.

A project under way at present in Egypt aims at preventing seasonal ophthalmia in 5000 pre school age children and at treating 2800 schoolchildren suffering from this malady. This project will make it possible to establish a plan for a systematic campaign against trichoma in the country and similar projects are envisaged for Iran, Jordan and Lebanon.

Environmental sanitation constitutes an integral part of programmes concerning health demonstration areas and the control of malaria, bilharziasis and communicable eye diseases. Several countries have organized basic training courses for sanitary engineers and technicians, and courses are already available for the training of sanitary inspectors, particularly food supply inspectors.

The governments of the Region attach great importance to nursing services. Four countries appointed nurses as members of their delegations to the Sub Committee, and the technical discussions in the plenary meetings on problems of nursing and nurses training were followed by a number of nurses from Jordan, Lebanon and Syria.

The Sub Committee recommended the adoption of a budget for the Region of more than US\$3 525 000 for 1957—i.e., \$1 012 000 against WHO's regular budget about \$1 083 000 to be provided by United Nations

Technical Assistance funds and the balance coming from other extra budgetary funds including those from UNICEF. A large part of this budget will be devoted to the control of communicable diseases to malaria in particular. The Sub Committee passed a resolution inviting Member States of the Region to participate in the campaign for the eradication of malaria. Such a campaign is justified by the fact that out of 170 million inhabitants 50 million live in malarious zones and only 1 500 000 enjoy effective protection.

The governments of the Region and the Regional Office will continue to pay particular attention to professional education and training of medical and health personnel of all categories including health auxiliaries.

After hearing a statement by the delegate of Iran with regard to measures adopted by his Government for combatting drug addiction the Sub Committee unanimously adopted a resolution put forward by the delegate of Egypt recommending the inclusion of the question of drug addiction in the WHO regional programmes.

Sub Committee A will hold its next session in 1956 in Teheran.

Regional Committee for the Western Pacific

The Regional Committee for the Western Pacific held its sixth session from 13 to 19 September 1955 in Singapore with fourteen Member States of the Region participating. Dr M. G. Candau, Director General of WHO, attended the meeting to which thirteen international organizations sent observers. The Chairman of the session was Dr R. H. Bland, Permanent Secretary to the Ministry of Health and Director of Medical Services, Singapore.

The Committee reviewed the report on the work accomplished in the Region from 1 July 1954 to 30 June 1955. WHO collaborated in national health programmes in the following domains: maternal and child health, environmental sanitation, health education of the public, malaria control, BCG vaccination campaigns, control of venereal diseases and treponematoses, nursing, mental health and education and training.

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Vol 9 No 8

THE EDUCATION OF SANITARY ENGINEERS

Page 231 left hand column (Undergraduate Education USA) line 9 10
delete the Massachusetts Institute of Technology and at

(Note The Massachusetts Institute of Technology abandoned awarding undergraduate degrees in sanitary engineering in 1944 sanitary engineering courses are still included as electives in the civil engineering programme —Ed)

Vol 9 No 10

SCHOOL HEALTH SERVICES IN EUROPE

Page 272 left hand column next to last paragraph
delete last sentence beginning For example

Page 275 left hand column line 25
delete elementary education
insert the education period



CHRONICLE OF THE WORLD HEALTH ORGANIZATION

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- No 10 Report on the first session of the Expert Committee on Environmental Sanitation
- No 16 Report on the first session of the Joint FAO/WHO Expert Committee on Nutrition
- No 22 Report on the first session of the Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel
- No 25 Report on the second session of the Expert Committee on Health Statistics
- No 44 Report on the second session of the Joint FAO/WHO Expert Committee on Nutrition
- No 53 Third report of the Expert Committee on Health Statistics
- No 59 First report of the Expert Committee on Trachoma

The publications should be addressed to: World Health Organization
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MALARIA IN SARAWAK AND BRUNEI

Before a malaria control pilot project was undertaken by WHO in 1952 little was known about malaria in Sarawak the "malaria map" of the country was "virtually blank." It was known that in British North Borneo and in other parts of the island *A. leucosphyrus* was the principal vector of malaria and it was thought likely that this was probably the vector of malaria in Sarawak as well. Control of *A. leucosphyrus*-carried malaria by residual spraying of insecticides had not yet been attempted.

The WHO project was a twofold one comprising a general malaria survey of the country and a field trial of residual insecticides. Reports by the malariologist assigned to this project sum up the findings of the survey and the results of the malaria control experiment.¹

Malaria survey of Sarawak and Brunei

Making a malaria survey of Sarawak was no easy matter. It is a thinly populated country with very poor communications and almost no roads and most of the villages had to be reached by canoe or on foot. In addition there are many languages and dialects and many different customs and habits. Nevertheless several hundred villages were visited the co-operation of the local populations was secured and nearly 10 000 persons were examined.

Geographically and geologically the country may be divided into alluvial coastal plains, hilly country and mountainous areas (in the

interior) only the latter two are important from the standpoint of malaria prevalence. Climatic conditions are favourable for malaria transmission throughout the year.

According to a 1947 census—the most recent one available—the population of Sarawak is 546 385. This population is composed of a great variety of racial and cultural groups including Sea Dayak (or Iban), Chinese, Malay, Land Dayak, Melanau, other indigenous groups, other non indigenous Asian groups and Europeans listed in order of decreasing numerical importance.

The small State of Brunei which is also on the north west coast of Borneo and which forms two enclaves in the Sarawak territory has climatic conditions similar to those found in Sarawak. Its population according to the 1947 census is 40 657.

Contrary to what the climatic and general conditions would suggest the survey revealed that malaria prevalence in Sarawak and Brunei is relatively low. Topography seems to be an important factor in malaria prevalence: higher spleen and parasite rates are found in the hilly and mountainous areas.

Of interest is the fact that the prevalence of malaria is not uniform among different racial groups living in the same area. For example the Dayak, Kayan and Kenyah who all have a semi nomadic way of life living in so called "longhouses" (villages under a single roof) and making temporary shelters or farms on the slopes of the mountains where they plant their rice suffer much more from malaria than the Malays and Chinese. Such differences are believed to be attributable to habits and ways of living rather than to any racial factor. During the months when the

For more detailed information how the project is conducted in two papers: the published the Bull. of the World Health Organization. Malaria in Sarawak and Brunei by J. d. Z. et al., and A. m. l. Control per me t in he l tenor l Borneo by J. d. Z. l ueta & F. La-hance.

SCHEDULE OF MEETINGS

1955

- | | |
|----------------|--|
| 5-9 December | Joint WHO/UN Advisory Group on Social and Medical Social Work, Amsterdam |
| 6-15 December | Study Group on Filariasis Kuala Lumpur |
| 12-14 December | Conference on Malaria Belgrade |
| 12-17 December | Seminar on Environmental Sanitation Ibadan Nigeria |
| 12-17 December | Expert Committee on Maternal and Child Health Administration Geneva |
| 14-16 December | Meeting of National Fellowships Administrators Geneva |

1956

- | | |
|------------|--|
| 9 January | Standing Committee on Administration and Finance, Geneva |
| 17 January | Executive Board seventeenth session Geneva |

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Dayak live in small shelters or rice farms they are less protected against mosquitos than in the longhouses. In addition domestic animals capable of deflecting anophelines from human beings are fewer in the farms than in the longhouses and assuming that breeding conditions are uniform the number of anophelines per person would be higher in an isolated farm than in a longhouse inhabited by several hundred people. On the other hand the Chinese who live in the bazaars are probably less exposed than the Dayak and being more conscious of the danger of malaria probably protect themselves better. By contrast however the Punan although they are a nomadic group also have a comparatively low malaria level. A possible explanation for this is that they do not live long enough in one place to infect *Anopheles* mosquitos and set up malaria transmission.

Another fact which seems to belie any relationship between the prevalence of malaria and racial characteristics as such is that the Malays in Sarawak who live on the coast and along the great rivers suffer little from malaria whereas relatively high spleen and parasite rates are found among the rural Malays in Brunei where the prevalence of malaria in the coastal areas is high probably because of the proximity of hills and mountains to the sea.

Malaria-control experiment

After visiting the five administrative divisions of Sarawak the WHO team decided to start the control experiment in the Baram District in the northern part of the country. This district although it presented problems because of its scattered population complete lack of roads and great distances to be covered had the advantage of offering for observation a well isolated population living with hardly any contact with the outside world

Supervision of the work was difficult because during 1952 and 1953 only Dr J. de Zulueta the WHO malarialogist was available for the project. However thanks to the assistance

FIG 3 MALARIA SURVEY OF SARAWAK.



Land Dayak, women in festive dress. The girl in the foreground has enlarged spleen (Upper Serian District).

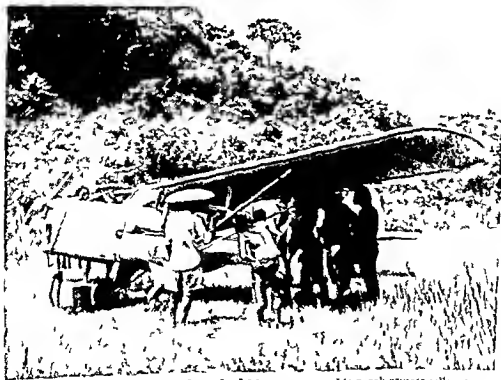
of all the government officers concerned and to the interest and co-operation of the people of the district it was possible to make a trial of malaria control by spraying with residual insecticides.

FIG 1 MALARIA SURVEY OF SARAWAK



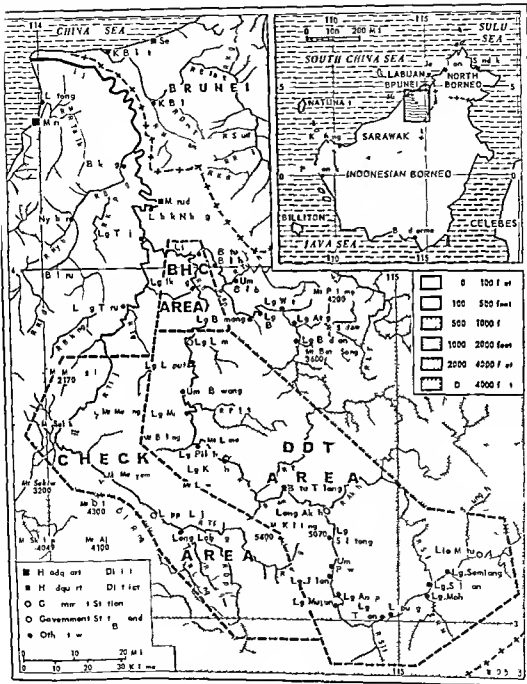
Carrying equipment and supplies across the forest (Upper Tinjar)

FIG 2 MALARIA SURVEY OF SARAWAK



An aeroplane of the Borneo Evangelical Mission was used to reach remote villages in the Upper Baram District. Onlookers are forest dwellers. Nomadic Piman.

FIG 6 MALARIA CONTROL IN SARAWAK



Northern Sarawak showing the positions of the DDT BHC and check areas



Kensah family sitting on the solidly built platform of their communal longhouse (Upper Baram)



A Sea Dayak rice farm built in a forest clearing Kanowit District

EPIDEMIOLOGY AND ETIOLOGY OF Q FEVER

Q fever is one of the diseases which are currently the subject of considerable study. Its etiology is known but its natural history has not been fully determined. The link between its natural and domestic hosts is still conjectural in certain aspects. Since determination of its distribution throughout the world was an indispensable prelude to any large scale control or prophylactic action WHO in 1950 recommended and began to assist in surveys of its prevalence in 31 countries. The results of these surveys supplemented by those of studies made in other countries have recently been published under the authorship of M. M. Kaplan and P. Bertagna.¹

Table 1 shows that Q fever is present in 51 countries in man or in animals but that it is unknown in certain others—Ireland, the Netherlands, the Scandinavian countries, Finland and New Zealand in particular. In these latter countries there is relatively little importation of cattle which may account for their being free from the infection.

Laboratory tests for the detection of *Rickettsia burneti* antibodies in human and animal sera are the sole means of making a definitive diagnosis of Q fever since the symptomatology in man or in animals is non-specific and the infection is often clinically inapparent. In the WHO-assisted surveys the suggested procedures were the complement fixation test combined where possible with attempted isolation of *R. burneti* in guinea pigs. The complement fixation test was chosen in preference to the agglutination test because it calls for smaller amounts of antigen and is easier to read and interpret. Three approaches were advised for the determination of the presence of Q fever in a locality: (1) the examination of blood sera

of employees in fat rendering plants and abattoirs; (2) inoculation into guinea pigs of milk samples pooled from 100 to 200 animals with pre and post inoculation examination of the guinea pig sera for complement fixing antibodies; and (3) examination by complement fixation test of individual animals selected at random in an area. WHO supplied the antigens (Henzerling and Nine Mile strains of *R. burneti*) and positive control serum (guinea pig) for antigen titration.

In another article on Q fever M. G. P. Stoker, Zoe Page & B. P. Marmion² discuss the problems which arose during the survey in England. Although it had been thought that the Henzerling and Nine Mile strains were interchangeable differences in sensitivity were found between them in examinations of human and sheep sera. The authors come to the conclusion that at present no antigen strain has a sufficiently wide range of specificity to react equally well with antibodies against all the local strains of *R. burneti*. Because of this comparison of the results of serological tests carried out with different antigens in different regions may not always be valid where the diagnosis of an individual case is involved.

In a third article devoted to the subject of Q fever M. G. P. Stoker & B. P. Marmion³ give a general review of the natural history of *R. burneti*. After having summarized present knowledge of *R. burneti* the authors list and discuss questions still to be answered, in particular those concerning the passage of the rickettsia from its natural wild hosts (ticks and small mammals) to its domestic hosts (cows, sheep and goats). A theory has been put forward which suggests the evolution

Figure 6 shows the positions of the test and check areas

The pre operational survey of the Baram DDT area showed that children in the age group 2-4 years had the highest parasite rate and that the highest spleen rate was found in children 5-9 years old the rates in adolescents and in adults were also high however indicating that immunity or tolerance had not been acquired. In fact, adults suffered from overt attacks of malaria with marked clinical symptoms throughout the study area.

Entomological observations were made in the demonstration area before and after spraying and systematic observations were made in the Tinjar check area during 13 months. It was soon found that in both areas *A. leucosphyrus* formed the bulk of the captures made in longhouses and farms. The most important entomological discovery was the finding that *A. leucosphyrus* Donitz 1901 was the vector in the area and not *A. leucosphyrus balabacensis* the known vector in British North Borneo. Among 7568 *A. leucosphyrus* dissected, 30 gland infections were detected—a sporozoite rate of 0.40%. *A. barbirostris* proved to be a secondary vector in both the check and the test area.

DDT, at the rate of 2 g per m² was used in residual spraying every six months over an area of 1800 square miles (4680 km²) with a population of 5622 inhabitants and BHC at the rate of 0.10 g of gamma isomer per m² every three months over an area of about 160 square miles (414 km²) with a population of 772 inhabitants.

After 21 months of DDT protection the spleen rate in children 2-9 years old was reduced from 51.8% to 25.1% and the parasite rate from 35.6% to 1.6%. Similar

results were obtained in the BHC area. During the period of observations spleen and parasite rates rose in the check area. The monthly examination of infants' blood showed that with only two exceptions all the infants born after the first spraying were free from malaria. The two new infections were acquired in unprotected houses built shortly after the spraying.

The first DDT spraying was limited to the Baram valley but the second was extended to the Patah and Akah rivers, two tributaries of the Upper Baram. To solve the problem of transport of insecticides an air drop of DDT supplies by the British Royal Air Force at Lio Matu was arranged by the Director of Medical Services of Sarawak. The drop took place in February 1954 and the DDT parachuted was used during the operations of March and September of that year.

The estimated cost of the DDT spraying operations was relatively high—US \$0.45 per person per year. This was due, however, mainly to two factors: difficulties of communications (54% of the time was spent travelling) and the need for spraying two dwellings for each family—their part of the communal longhouse and their individual rice farm. It is believed that further experience may show that the surface sprayed and hence the amount of insecticide used can be reduced. DDT spraying every six months is preferable to BHC spraying every three months because of the great difficulties with regard to communications and transport.

The results of this experiment show that *A. leucosphyrus* carried malaria in Sarawak can be effectively controlled by residual spraying of insecticides: an indication that eradication is feasible.

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TABLE I GEOGRAPHICAL DISTRIBUTION OF Q FEVER AND SPECIES AFFECTED

Country	Diagnostic test used		Infected species
	complement fixation test	isolation of organism	
Africa			
Algeria	+	+	Man tick
Belgian Congo (Ruanda Urundi)	+	+	Man sheep goat cattle horse pig dog tick body louse
Cameroons (Douala and east and north east)	+		Man cattle
Egypt (Cairo Aswan Nile valley)	+	+	Man sheep goat bull cow water buffalo tick
French Equatorial Africa (Ubangi Shari Upper Volta)			Man sheep goat cattle donkey dog
Kenya (Muguga Nairobi)			Man cattle
Libya			Man
Madagascar	+		Man
Morocco (through out)	+		Man sheep goat cattle gerbil tick
Portuguese Guinea and São Tomé	+		Goat cattle birds reptiles tick
Southern Rhodesia	+		Man
Sudan	+	+	Camel bull tick
Tunisia	+		Man sheep goat cattle
Union of South Africa (Western Transvaal, Natal, Cape Province)	+		Man cattle
America			
Argentina			Cattle
Brazil			Man
Canada (Quebec)			Man
Martinique	+		Man
Mexico	+		Man sheep goat cattle
Panama	+	+	Man
America (cont.)			
United States of America (Arizona California Illinois Massachusetts Montana New York Ohio Oregon Texas Virginia Washington)	+	+	Man sheep cattle tick
Venezuela (Caracas)	+		Man
Asia			
Ceylon	+		Man sheep goat, buffalo cattle
China (Peking)	+		Man
India (Bombay Madras Cochin)	+		Man sheep goat bullock cow
Indonesia	+		Cattle
Iran (various provinces)	+		Man sheep goat cow dromedary
Iraq (Habbaniya)	+		Man
Israel	+	+	Man cattle
Japan (Kumamoto Kanagawa Okayama)	+		Man sheep goat, cattle
Jordan	+		Sheep goat cattle camel
Lebanon	— (500 cattle sera in 1954) + (capillary agglutination test on milk samples in 1955)		
Malaya	+		Man cattle goat
Pakistan	+		Camel
Turkey (20 of 63 vilayets)	+	+	Man sheep goat cattle buffalo tick
Union of Soviet Socialist Republics (Central Asian oblasts)	+		Man cattle

TABLE I GEOGRAPHICAL DISTRIBUTION OF Q FEVER AND SPECIES AFFECTED (cont. ed)

Country	Diagnostic test used		Infected species
	complement fixation test	solatogon test	
Europe			
Austrian (Tyrol)	+		Mountain goat
Bulgaria (Sofia)		+	Mountain goat, sheep
Cyprus			Mountain sheep, goat, cattle
Czechoslovakia (Prague)	+		Mountain sheep
Denmark	— (mountain cattle 1700 sera tested)		
Finland	— (mountain cattle 3000 sera tested)		
France (Savoie, Pays de la Loire, Vichy, Allier, Montpazier)			Mountain goat, sheep, dog
Germany (Federation of Republics: Hamburg, Baden-Württemberg, Hohenzollern, Stuttgart)			Mountain goat, sheep, cattle
Greece			Mountain goat, sheep
Hungary (Budapest)			Mountain goat
Iceland	— (few human and sheep sera tested)		
Ireland	— (mountain cattle 800 sera tested)		
Italy (throughout)			Mountain goat, sheep, cattle, dog, pig, goat
Netherlands	— (mountain cattle 3200 sera tested, 2 doubtful reactions 1/15)		
Norway	— (cattle)		
Europe (cont.)			
Poland	— (7/1000 sera tested, 7 doubtful reactions below 1/16)		
Portugal (throughout)	+	+	Mountain goat, sheep, cattle, tick
Romania (Bucharest)	+	+	Mountain goat
Soviet Union (Siberia)	+		Mountain goat, sheep, cattle, pig, goat (?)
Spain (Madrid and surroundings)	+	—	Mountain cattle, dog, mouse, wild rabbit, tick
Sweden	— (mountain cattle 1100 sera tested)		
Switzerland (Aargau, St. Gallen, Zurich, Graubünden)	+	+	Mountain goat, sheep, cattle (?)
Union of Soviet Socialist Republics (Mongolia)	+		Mountain goat, sheep, cattle
United Kingdom (Great Britain and Northern Ireland, Devon, Kent, Lothian, Scotland, Wales)	+	+	Mountain goat, sheep, cattle, tick
Yugoslavia (Belgrade, Sokolovac, Ogulin, Croatia)	+	+	Mountain goat, sheep
Oceania			
Australia (New South Wales, Northern Territory, Queensland, South Australia, Victoria)	+	+	Mountain goat, sheep, cattle, dog, tick
New Zealand	— (14000 sera tested, 1 imported animal showed infection 1/4000)		

of *R. burneti* during successive cycles. The first cycle is held to be a wild one observed only in Australia on the small island of Moreton where the rickettsia is maintained by ticks and bandicoots in the absence of cattle. The second cycle is a domestic one. The infection is supposed to pass from wild animals to cows, sheep and goats through the intermediary of ticks with a varied range of hosts and to be maintained by domestic animals thanks perhaps to different ticks, limited to the cow, sheep and goat. Finally, Q fever could be maintained exclusively by cattle without the intervention of ticks through infected placentae.

A special feature of *R. burneti* differentiating it from other pathogenic rickettsiae is its adaptation to growth in the placenta and mammary glands of cows, ewes and goats. The rickettsiae are excreted at the time of parturition. In regions with a hot dry climate such as California the placentae dry in the open and are finally reduced to dust. Owing to its exceptional resistance to heat, sunlight, drying and the usual disinfectants, *R. burneti* survives in this dust which infects animals inhaling it. In this case the infection maintains itself in a closed circuit and constitutes a partly artificial cycle brought about by stock raising methods. This type of transmission may not be seen in areas where the climate is unfavourable and where stock raising methods are different; ticks may then play a more important role as vectors.

Serious gaps in knowledge of Q fever prevent the establishment of a link between these three cycles. Indeed although the ticks of which 22 species have been found to be infected in nature are considered to be the chief natural vectors, there is no proof that they play a part in the systematic transmission of the disease from wild animals to domestic ones. Certain authors even adopt the viewpoint that the numerous localizations and varied hosts of *R. burneti* are a sign of a more primitive state, an absence of specializa-

tion in this micro organism which is incompatible with the evolutionary theory.

The exceptional resistance of *R. burneti* to adverse conditions is probably an important factor in the etiology of Q fever. Besides its ability to survive relatively high temperatures, drying and disinfectants, *R. burneti* shows a remarkable resistance to circulating antibody in the tissues of its mammalian hosts. Study of this apparently paradoxical fact led to the discovery of two phases in the growth of this rickettsia in the laboratory. When freshly isolated from the tissues and during the first passages of the culture on the yolk sac of the hen's egg, the rickettsial suspensions fail to agglutinate with homologous or heterologous anti-*burneti* sera. After a certain number of passages a change takes place and the suspension becomes agglutinable. This resistance to antibodies in the host organism affords in particular an explanation of the survival of *R. burneti* from one parturition to another.

Man is the only host of *R. burneti* who develops a clinical illness following infection, i.e. fever, headache and often pneumonia. Q fever has so far, never appeared in the form of a true epidemic spreading by transmission from man to man, but inter-human transmission in hospitals has been reported. More or less numerous sporadic cases occur in regions where Q fever is endemic in cattle, sheep and goats. Inapparent infections are frequent, as shown by the presence of antibodies in the serum; the latter may persist even several years after the infection. Man usually becomes infected by inhaling infected dust or droplets, although the drinking of contaminated milk and water may also cause infection.

For the time being it is clear that man is not an important biological host of *R. burneti*. He becomes infected only accidentally through the intermediary of domestic animals. Nevertheless, the possibility cannot be excluded that *R. burneti*, which seems to develop very well in the human body, might

adapt itself to growth in the respiratory tract and on being excreted through coughing and spitting might spread the disease from man to man. A case in which several persons were infected by the sputum of a patient has

been reported. It is therefore not impossible that we are approaching an adaptation of *R. burneti* to man who would thus be added to the list of warm blooded animals acting as hosts for this rickettsia.

PUBLIC HEALTH IMPLICATIONS OF THE AGING OF POPULATIONS

Conclusions of a WHO Meeting *

In many populations particularly in those of highly industrialized regions the proportion of persons past 65 years of age is steadily increasing. A figure of 10% of the total population is not uncommon in Germany for example the percentage was 4.8% in 1880 and 7.5% in 1939 and today it is 10% the figure is expected to be about 13% by 1972.

This aging of the population implies problems of great significance for social and health services. Industrialization, housing shortages and general changes in the social picture of many countries are leading to disruption of family ties and more and more the aged are finding it difficult to retain their place in the family circle—particularly if they are without financial means or if they fall ill. The care of this segment of the population is therefore devolving increasingly upon the State.

Home care

Home care of the aged in health and in sickness should be encouraged whenever it is medically possible. If it is necessary to admit an old person to hospital he should be discharged as quickly as his physical condition permits in order to avoid prolonged

separation from his home environment and the psychological complications which often result from such a separation.

What does home care mean in terms of the health and social services of a government? First it calls for the whole hearted co-operation of a team of skilled workers including general practitioners, trained nurses, home helps, medical auxiliaries of one kind or another and voluntary or official visitors. Health departments could provide and organize many valuable services based essentially on the home—e.g. clubs for the aged and domestic help for household tasks and the preparation of meals. Technical staffs could see to it that the aged enjoy special amenities and comforts including suitable housing equipment (special hand rails on stairs and baths, good lighting and heating etc). In many cases the provision of a reasonable standard of life for the aged hinges upon financial considerations but the cost of good home care should be weighed against the high capital and maintenance charges of institutions and above all of hospitals. Further many of the simple services for the aged could be efficiently provided by voluntary bodies especially visiting services and help in shopping and household chores.

Sometimes a simple disability such as one related to lack of proper care of the feet

*Based on summary report on the technical discussions at the fifth session of the Regional Committee for Europe prepared, at the Committee's request, by Professor J. M. Maudsley, of the London School of Hygiene and Tropical Medicine.

may interfere with the full enjoyment of age and the capacity for the simple employment that makes the day seem shorter. Skilled services in caring for simple health needs are essential but this too presents problems from a personnel standpoint. Already the increased home care of the old is adding to the burden of work of general practitioners and their staffs. It has been stated for example, that in one urban area the family doctor is paying three times as many professional visits to people over 65 as to the whole of the younger age groups and in the case of the district nurse eight visits are being made to the elderly for every one to the other population groups.

Age and employment

Many crucial problems of the aging population are bound up with that of employment. Limiting the employment of the aged by fixing a recognized retiring age often stems as much from the economic difficulty of finding employment for the young as from the actual inability of the aged to carry on in their jobs. Retirement might be more readily accepted in many instances if there were no legal prohibition against taking remunerative work while drawing a pension which is a common proviso.

In Norway a survey has been made recently among a group of workers aged 60 to 65 to find out whether or not the workers (a) thought themselves fit to continue working at their existing jobs (b) would prefer to take a lighter job or (c) would like to give up work altogether. At the same time industrial physicians were asked to assess the fitness of the employees in question for their work. It was found that a high proportion were physically able to continue their work. The workers' views however were governed largely by financial considerations that is by whether or not they could retain their pensions and

at the same time take other remunerative work and thus avoid a sudden drop in their standard of living.

Financial considerations aside, effective socio-economic care of the aged requires that if possible they be given remunerative employment, for the sake of the therapeutic value of such employment. Subject to the therapeutic selection of simple work for short periods each day, it is preferable to permit the aged to work without loss of pension rights. As in the case of the young however it is necessary to study each individual raising or lowering an arbitrarily established retirement age is no solution. An age level is merely a legal convenience—a good servant but a bad master.

Prophylaxis

Prevention of the aging process may be considered from two aspects: measures to delay or mitigate the process itself and measures to prevent or at least to delay the onset and progress of disease.

Generally speaking we are not yet in possession of knowledge which permits us to take prophylactic measures against aging. However important studies on this subject are in progress with emphasis being laid on nutritional and other factors which have an effect on the development of arterial changes. One line of research which is being pursued is study of the aging process through periodic medical examinations of persons during their middle years. Experiments along this line have been encouraging and the response excellent. In some countries there has been 95% agreement to voluntary medical examination for this purpose.

Studies in Sweden have revealed an excessive mortality among men between the ages of 45 and 75 particularly in the big cities. It is believed that this mortality may be traced to the strains of modern life and to

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consequent cardiovascular diseases such as arteriosclerosis and hypertension. This points to the importance of psychological factors in the "prophylaxis of age."

Much more could be done to prevent disease and to treat early conditions which can cause great distress and contribute to aging and incapacity. In this domain too research is needed not only on the physical conditions associated with age but also on the more troublesome mental states to which the old are frequently subject.

Hospitals and institutions

As has been pointed out it is better to avoid hospitalization of the aged as much as possible and to limit stay in hospital to the period during which such a stay is therapeutically required and no longer. One of the dangers of lengthy hospital care is that the institution comes to be regarded as "the ante room of death" and not as a place of temporary treatment.

The aged sick have the same need for and claim to expert diagnosis and treatment as have the young and they should be cared for by the same services. However it is essential in many instances to build upon the existing services in order to assure the care of the chronically ill. One solution for the care of chronic cases is the provision of rest homes, small homes in which the inmates can lead a normal life under medical and nursing supervision.

Special geriatric services may be required for meeting the medical emergencies of the aged and such services should provide high grade care including skilled diagnosis, treatment and a full range of rehabilitation. The last is particularly important in the case of the aged. A considerable proportion of the patients of such geriatric units (up to 70%) should be ready for discharge to their homes in six or seven weeks.

In general there is need for hospitals for both chronic and acute diseases but the two types of institution should work in the closest possible collaboration being located close to each other or at least being under the same executive direction. This is important as a means of preventing the "chronic" hospital from being considered as a somewhat inferior institution with consequent unfortunate effects on staffing. The aim of both types of hospital is the same—to send the patient back to his home and familiar surroundings as soon as possible and with the greatest possible improvement in his physical and mental condition.

Mental health

The mental health problems of the aged are also demanding the increasing attention of public health services. There is an augmentation in hospitalization for mental disorders in the older age groups.

Clinical and sociological investigation in the mental hospital at Göteborg, Sweden, showed that about one third of the cases in the "psycho-geriatric" group suffered from organic cerebral disease, one third from the so-called "involutional psychoses" and the remainder from clinical neuroses of later maturity. The prominence of the neuroses indicates that much more must be done to promote mental health in the aging and that the subject calls for prophylactic action both medical and social. A need for more research is also evident.

In a number of countries there are child guidance clinics for neurotic children and their parents and special consultative centres for problem families. Similar clinics or centres might perhaps be established for the aged who should nevertheless be considered as ordinary members of families, not as a group apart. Such services might help to solve some of the problems that arise from

the various stresses and strains to which the aged are particularly exposed

Role of the central administration

While the actual functioning of services for the medical and social care of the aged must generally be entrusted to local bodies official and voluntary the central government administration has an essential role to

play in guidance provision of financial grants and promotion of research. Valuable demographic studies also come within the province of the central authorities as does co-ordination of the information supplied by local bodies. The central administration has in addition an important place in health education of the public regarding the medical and social problems associated with the aging of the population.

SOUTH AMERICAN SEMINAR ON MENTAL HEALTH

A seminar on mental health organized by the Government of Uruguay and the Pan American Sanitary Bureau which acts as WHO Regional Office for the Americas was held in Montevideo in July 1955. This seminar the first on the subject to take place in South America was attended by representatives from Argentina Brazil Chile Ecuador Paraguay Peru Uruguay and Venezuela.

The seminar covered a wide range of topics with particular emphasis on the prevention and treatment of mental disorders the mental health problems of children the technical training of those engaged directly or indirectly in mental health work and the mental health education of the public.

Prevention

Attempts to prevent mental disorders should begin with consideration of socio-economic and health factors which are often at the root of such disorders. Next in order is attention to the mental as well as the physical health of pregnant women because of the subsequent influence upon the child. Then comes the problem of infant care and in this stress must be laid on the importance of keeping mother and child together during the early formative years. A harmonious family life is most important in the emotional development of the child and every effort

should be made to preserve the family unit (abandonment of the home by the father seems to be a frequent occurrence in some countries of South America). At adolescence the problem arises of providing the child with knowledge of sexual physiology which if it cannot be properly handled by the parents should be entrusted to teachers or health workers qualified to give the necessary instruction.

Other considerations in preventing mental illness discussed at the seminar were the psychological implications of hospitalization of children the provision of recreational and educational facilities to promote the healthy social and emotional development of children and education of the public in mental health principles especially of parents and of members of the community who have an influence on others such as teachers clergymen nurses and social workers. Mention was made of the desirability of pre-marital health examinations to prevent the transmission of disease and to assess the individuals maturity and suitability for entering into marriage.

Treatment

In their discussion of treatment of mental illness and its ramifications the seminar participants emphasized the necessity for

specialist care which includes medical paedagogical social and educational aspects. Particular attention was given to the psychological problems of children and to ways of dealing with these problems—for example through child guidance or behaviour clinics in which psychiatrists psychologists and social workers all collaborate. Special classes and facilities should be arranged for children who are mentally deficient or have learning difficulties. Whenever possible institutionalization of children should be avoided.

From the viewpoint of psychiatry and mental health delinquency in children or adolescents should be regarded as a problem of behaviour and treated as such. The idea of prevention and treatment should replace that of punishment of misdeemeanours. The delinquent being made the subject of study rather than the object of retributive action.

Education of parents and of the general public

Education of parents and of the general public in matters of mental health is a primary requisite in promoting good mental health in children. Such education should stress the positive aspects of mental health avoiding descriptions of pathological symptoms. The teaching content and methods must be adapted to local conditions to the socio-economic and cultural milieu of the people concerned.

Mass media such as the cinema broad casts and the press may be useful in mental health education of the public but methods based on instruction of small groups with the active participation of the members of the group are thought to be more effective.

Training of mental health workers

Child psychiatry was felt by the seminar participants to be a speciality the practice of which calls for special knowledge and appropriate personal qualifications. The preparation of this specialist should include basic

training in psychiatry psychology and paediatrics and should comprise practical experience as well as theory.

Members of the medical educational and other professions which have to work with children—e.g. physicians paediatricians nurses psychologists teachers and social workers—should have some knowledge of child psychology and psychiatry.

Plans for mental health programmes

The seminar afforded the participants an opportunity to review the mental health programmes and plans of the various South American countries. The picture which emerged showed that in this region mental health work is for the most part still in its initial stages and that its radius of action is still very limited and is confined largely to urban areas. Technical personnel is in short supply and is often inadequately trained. Institutional facilities are insufficient.

There is a great need for an assessment of the magnitude of psychiatric and mental health problems in South America and studies towards this end should be encouraged. Generally speaking it is considered that even the most urgent requirements are not being met.

The present tendency is to combine mental health work with public health activities at health centres but the desirability of having special guidance clinics for children is also recognized. An important first step in focusing attention on mental health principles and problems as applied to children is arousing the interest of South American parents.

The seminar participants suggested that a South American centre or institute for training mental health workers should be established using as a nucleus the institutions which already exist in certain countries. The assistance of WHO and the Pan American Sanitary Bureau is being sought for carrying out this proposal.

Reports of Expert Groups

AMPUTEES AND PROSTHESES

The problem of the amputee is one of world wide import with social economic industrial and psychological concomitants affecting many more people than those actually suffering amputation. Nations seek advice on measures which have been or could be evolved for preventing amputation and reducing disability by proper rehabilitation. As a means of bringing together and disseminating information on this subject WHO convened, in August 1954 in Copenhagen a conference on prosthetics in which the United Nations, the International Society for the Welfare of Cripples, and the World Veterans Federation also participated. The report on this conference has now been made available in the *Technical Report Series* of WHO¹.

This report opens with a consideration of the incidence causation and prevention of amputation. Statistics on the incidence of amputation are at present inadequate and their collection should be encouraged so that health authorities intending to set up an artificial limb service may have some knowledge of the extent of the problem with which they are faced and so that the information on causes of amputation which such statistics may reveal may contribute to knowledge of prevention.

The statistics that are available show that

the number of amputees in certain Western countries varies between 0.5% and 1.25% of the population. Data from the USA give some idea of the extent of the problem among civilians while approximately 20 000 persons suffered amputation in the Armed Services during the Second World War, during the same period 120 000 civilians lost their limbs from accident and disease.

Major sections of the report deal with basic principles and practices in the rehabilitation of the amputee, including surgical and post amputation treatment and the psychological aspects of this treatment, the selection fitting and use of artificial limbs, and vocational guidance and training for and selective placement of, the amputee. Among other subjects covered are the essentials of a limb fitting service, the training of relevant personnel and administrative problems. Detailed descriptions of simplified artificial limbs are given. Lastly, problems requiring research and matters which might call for international action are considered.

The report also contains a number of annexes of a practical nature: (1) Reports on the causes of amputation (2) Review of existing types of prostheses (3) Lay out and equipment of a large limb fitting centre (4) Method of applying a nylon film to leather work (5) Illustrations of simplified artificial limbs and (6) a selected bibliography.

¹ *W.H.O. Techn. Rep. Ser.* 1955 100. 5 pages. Price 3/6 \$0.60 or Sw. fr. 7.— Published in Engl., Fr., Fench. and Spanish.

Health Legislation

THE CONTROL OF INSECT VECTORS IN INTERNATIONAL AIR TRAFFIC

The control of insect vectors in international air traffic is at present governed by the International Sanitary Regulations and by paragraph 2 of Article XVII of the International Sanitary Convention for Aerial Navigation 1944 this paragraph being maintained by a particular provision of the Regulations

The value of the measures taken in application of international sanitary legislation is no longer in doubt seeing that insects which are the vectors of serious diseases such as yellow fever malaria filariasis dengue fever plague typhus trypanosomiasis and others may be transported from one country to another by means of aircraft Studies have been made which show that the vitality of such insects is not necessarily affected by changes in temperature or atmospheric pressure even during long flights and that the vibration of modern aircraft does not unduly affect their activity It seems also to be established that by means of air transport certain species of insects have been introduced into territories where they were formerly unknown The success or failure of campaigns for the control of certain diseases such as malaria may thus depend on air transport

In addition to the International Sanitary Regulations many countries have special requirements designed to prevent the introduction of insect vectors of disease into their territories by air

Five expert advisory bodies of the World Health Organization have made recommendations on the disinsection of aircraft the Yellow Fever Panel the Expert Committee on International Epidemiology and Quarantine (now replaced by the Committee on International Quarantine) the Expert Com-

mittee on Insecticides the Expert Committee on Malaria and the Committee on International Quarantine

A study in the form of an analytical survey of the regulations for disinsection of aircraft of 98 states and territories has just been published in the *International Digest of Health Legislation*¹ The material is arranged under the following headings Introduction Statement of the problem and review of the literature Review of present-day practices (disinsection requirements when disinsection is carried out method of disinsection for mulations of insecticides used dosage and time of application measures taken to prevent spread of agricultural pests) Recommendations made to the Organization in regard to disinsection of aircraft Discussion The present position and Conclusion Four appendices—dealing respectively with disinsection requirements when disinsection is carried out formulations of insecticides used dosage and method of application and measures taken to prevent the spread of agricultural pests—summarize the material studied

This study shows that the requirements for the disinsection of aircraft and the methods used vary considerably in different countries Nevertheless the experience gained in the application of disinsection measures and the important advances made in the use of modern insecticides will perhaps enable the World Health Organization in the near future to recommend to health administrations simple and effective methods for the control of certain diseases in international air traffic

¹ *Int. Dig. Health Leg.* 19 5 6 377-435. This study is also available in pamphlet (Price 3 6, \$0.70) or 5w (—). Published in English and in French.

Notes and News

Nutrition Training Course

A second training course in nutrition for personnel expected to work in Africa is being given in Marseilles France. It began on 4 October and is lasting until 10 December 1955. The course, which is in French, is sponsored by the French Government, FAO and WHO. It will be followed by a period of practical work in Africa. A similar course was held, also in Marseilles in 1952 and it was the success of this first course which led to the organization of the present one.

The course is being attended by medical officers, pharmacists, chemists, agricultural experts and veterinarians. WHO has provided fellowships for participants from Angola, the Belgian Congo, French West Africa, Madagascar, Morocco (French Zone), Mozambique and Somaliland under Italian Trusteeship.

Approximately 145 lectures and a series of 45 practical work sessions, together with discussions and visits, make up the programme of the course. Thirty-four specialists are covering the various aspects of nutrition for about forty course participants. Attention is being focused on the nutritional problems particular to Africa, account being taken of sociological factors involved and of the food resources of the continent.

This training course is only part of WHO's assistance in efforts to improve nutrition in Africa. The Organization is co-operating through the provision of the services of two specialists, in the work of the research group on malnutrition among infants of the Medical Research Council at Kampala, Uganda. It has also supplied consultants to assist the Governments of Basutoland, Uganda and Tanganyika in nutrition surveys and in mapping out programmes to prevent and alleviate dietary deficiencies. In October 1955 a WHO consultant, Professor A. Woodruff, was in Mauritius investigating one of the nutritional problems of public health importance—anaemia.

During the early part of 1956, the Organization's Inter-Regional Adviser on Nutrition will be visiting Africa to make a study of prevalent nutritional problems in connection with public health activities.

WHO Fellowships Programme in Africa

One of the WHO activities in Africa which is showing a steady increase is the award of fellowships. Between 1950 and 1953 the number of fellowships in the Region totalled 92, but in 1954 alone the number of awards was 81 and the figure for 1955 is expected to reach 135. The fellowships programme now covers 32 of the 43 countries and territories of the African Region.

As in other WHO Regions, many of the fellowships awarded in Africa are for special training courses, often those organized or aided by WHO. For example, in 1955 there were 43 grants of this kind, including 11 fellowships for a course in malaria prophylaxis given in Yaounde, 4 for two courses in social paediatrics organized in Paris by the International Children's Centre, 2 for the anaesthesiology course in Copenhagen, 5 for an insect control course in Rome, and 2 for a course in dermatology and venereology held in Madrid. In addition, fellowships were awarded to enable their holders to attend a special course on environmental control given at the London School of Hygiene and Tropical Medicine and others for a course leading to the Diploma in Content and Methods of Health Education organized by the Institute of Education of London University.

During the past year fellows of the African Region studied in 33 different countries. The present trend, however, is to place a greater proportion of fellowships within the Region where possible, in order to promote reciprocal knowledge of African problems, particularly those concerning the control of the principal endemic diseases.

Seminar on Sanitary Engineering

A seminar on sanitary engineering for engineers from Mexico Cuba the Dominican Republic Haiti and other Caribbean countries and territories was held in Puerto Rico from 1 to 10 November 1955 under the auspices of WHO through its Regional Office for the Americas. It was the third seminar of this type to take place in the Region one having been held in Managua Nicaragua in 1952 and another in Caracas Venezuela in 1954.

The main subjects of the seminar which included round table discussions and held trips as well as lectures and demonstrations were water supply and sewage disposal in the Caribbean area the role of the sanitary engineer in public health the education and training of sanitary engineers and auxiliary personnel food control and housing problems.

Survey of Nursing Resources in the Americas

The Pan American Sanitary Bureau (PASB) which serves also as WHO Regional Office for the Americas is assisting the nursing associations of a number of American countries in surveying national nursing resources. The data collected will include the number of nurses their level of education and training and their specific type of employment. These surveys are intended partly to supply background information as a basis for the technical discussions to be held at the time of the Ninth World Health Assembly (June 1956 Geneva) the subject of which is The Nurse—Her Education and Role in Health Services.

The Brazilian Nurse Association is making an even more detailed study of nursing resources than that planned by the PASB. An advisory committee for the project has been set up which includes representatives of the Brazilian Ministry of Health the Ministry of Education the Serviço Brasileiro de Saúde Pública the Rockefeller Foundation and PASB WHO. The PASB has been requested to provide a nurse adviser

to assist in carrying out the survey and the Rockefeller Foundation has allotted \$10 000 for the project and will also grant a three month fellowship to a Brazilian nurse to enable her to study survey techniques in the USA.

Yellow Fever in the Americas

An outbreak of yellow fever in Panama in 1948 spread steadily northward between that year and 1954. In 1954 a single case was found in Honduras but no other cases were reported in Central America during that year. The Pan American Sanitary Bureau (PASB) which acts also as WHO Regional Office for the Americas sent a consultant Dr Jorge Boshell to Central America to make studies of the expected path of the disease.

Extensive investigations carried out by PASB consultants in the summer of 1955 in northern Honduras and the Peten region of Guatemala indicated that this wave of jungle yellow fever had perhaps reached the end of its course.

Continent wide efforts to eradicate *Aedes aegypti* the urban carrier of yellow fever are making considerable headway. Experience has shown that eradication campaigns call for thoroughness and constant vigilance. The development in an occasional strain of *Aedes aegypti* of resistance to residual insecticides such as DDT is causing concern and is emphasizing the importance of another factor—time.

Dr J. Austin Kerr former Director of the Virus Research Center Poona India has been assigned by the Rockefeller Foundation to work with the PASB as a special adviser in the study of yellow fever and related virus diseases. Dr Kerr is expected to visit Central America Colombia Brazil and other countries in the Region.

International Training Course for Health Physicists

An international training course for health physicists—the first international course of this kind—was held at the Karolinska

Whooping cough Immunization Committee of the Medical Research Council of Great Britain. In his second paper, he reviews the use of mixed diphtheria pertussis tetanus antigens in the light of the information which has become available in recent years. It seems clear that mixed antigens will be very useful in future immunization campaigns although much further study is necessary, especially on the immunizing effect of the pertussis component before their value can be finally assessed.

In an article on passive immunization against measles A Bertoye deals first with the choice of prophylactic including gamma globulin and then with the factors governing the selection of persons to be protected and the choice between absolute prevention and attenuation of the disease.

The developments made in the last thirty years in the production of smallpox vaccine are reviewed by D McClean who also discusses the duration of immunity and the protection afforded after contact with small pox.

P Lepine in the following article reviews the various methods of poliomyelitis prevention and the principles on which they are based. He then considers in detail the problem of vaccination against poliomyelitis with various types of vaccine and the difficulties which have yet to be overcome.

R Prigge discusses the development of diphtheria toxoid and the use and influence of different adjuvants on the activity of this prophylactic. In the last article O Gunther deals with the phenomena of the antagonism and synergy of antigens the importance of which in preventive vaccination may well be considerably greater than was formerly supposed.

With the exception of the contribution by P Lepine all the articles are in English with resumes in French.

It is believed that the application of the principles and procedures reported in this selection of papers is likely to contribute considerably towards solving some of the major communicable disease problems still facing public health authorities and the medical profession.
